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A REVISION OF THE SPECIES OF *PANDELETEIUS*
SCHÖNHERR AND *PANDELETEINUS* CHAMPION
OF AMERICA NORTH OF MEXICO
(COLEOPTERA: CURCULIONIDAE)

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INTRODUCTION

Although *Pandeteleius* Schönherr and *Pandeteleinus* Champion are principally Mexican and South American, they are abundantly represented in the fauna north of the Mexican border. Many of the species considered here occur in Mexico as well as the United States and Canada. Pieree (1919, p. 22) remarks that "No genus or larger group should be studied alone from the standpoint of a single geographic region or subdivision." Although this is particularly pertinent to *Pandeteleius* and *Pandeteleinus*, their study cannot be effectively extended south of the border until extensive collections are made in the area.

In the present paper, three new species are described in the formerly monotypic *Pandeteleinus*, and in *Pandeteleius* four new species are described and four names are synonymized. Leetotypes are designated for *Pandeteleinus submetallicus* (Schaeffer) and *Pandeteleius robustus* Schaeffer.

ACKNOWLEDGMENTS

Without the generous loan of specimens from numerous institutions and individuals, the present work could not have been accomplished. In the

following list of collections studied, the letters in parentheses represent the abbreviations used in the text when citing material studied; the name of the curator responsible for the loan of the specimens follows the abbreviation: American Museum of Natural History (AMNH), Patricia Vaurie; California Academy of Sciences (CAS), Hugh B. Leech; Canadian National Collection (CNC), W. J. Brown; Cornell University (CU), Henry Dietrich; Illinois Natural History Survey (INHS), H. H. Ross; Museum of Comparative Zoology (MCZ), E. A. Chapin; Ohio State University (OSU), J. N. Knull; United States National Museum (USNM), Rose Ella Warner; University of Arizona (UA), Floyd G. Werner and Charles O'Brien.

The following individuals graciously loaned material from their personal collections: L. J. Bottimer, C. A. Frost, J. M. Kingsolver, and E. L. Sleeper.

Especially, I would like to thank L. L. Buchanan for the gracious loan of his extensive notes on *Pandeleteius* and Rose Ella Warner for help on numerous questions. Dr. E. A. Chapin carefully compared specimens with the type of *Pandeleteius simplarius* Fall in the Museum of Comparative Zoology collection. Dr. W. H. Anderson was of much assistance in procuring literature.

Most of all, I want to express my appreciation of my husband's invaluable help with every aspect of the preparation of the paper.

PROCEDURE

Through the very liberal loan of specimens from the institutions and individuals thanked above, the majority of the specimens and type material in the United States and Canada were available for study. To avoid confusion, throughout the paper the abbreviation "P." is used to refer to *Pandeleteius* and "Pn." to *Pandeleteinus*.

The length of *Pandeleteius* specimens was measured from the apex of the elytra to the anterior margin of the eyes, or, if the beak was so inclined that the eyes were not visible dorsally, the length was measured to the anteriormost dorsal point of the head or beak. The length of *Pandeleteinus* specimens was measured from the anterior margin of the frontal prominence instead of from the anterior margin of the eyes.

Good specific characteristics are found on the scales and setae, but they vary from one part of the beetle to another. The most typical and constant characters are found on the scales and setae of the disc of the thorax and elytra, and these are the ones referred to herein unless others are specified. The sculpture of the scales is not distinct until examined under 45× to 90× magnification, and even then it is difficult to discern on dirty or greasy specimens. In some specimens, normally-white scales are non-metallic greenish-blue, light aqua, or even dark gray-blue. These colors in such specimens

should be interpreted as white or near-white. Occasionally a general specimen will show faint coppery, iridescent reflections between the scales. This is noticed particularly in *Pn. magdalenensis*, new species, *P. cinereus* Horn, and *P. hilaris* (Herbst).

The sclerite that is within the apical emargination of the beak or extends forward from the apex of the beak has been left unnamed or vaguely referred to as the "nasal plate" by former workers in *Pandeleteius*. The author has used the more widely accepted term of "epistoma," as interpreted by Blatchley and Leng (1916, p. 8, fig. 2) and Torre-Bueno (1937, p. 93): "in rhynchophorous beetles, the reduced frontoclypeal region." When the epistoma is extended over the mandibles beyond the sides of the beak, the anterior margin is vulnerable to abrasion and hence is often irregular. This should be remembered when examining a specimen with an extended epistoma.

Secondary sexual characters are numerous in both genera, but are more numerous and more strongly expressed in *Pandeleteius* than in *Pandeleteinus*. Sexual characters common to both genera are found in: the last abdominal segment, which is completely margined and rounded at apex in the female, and truncate or emarginate at apex and with marginal line absent at apex in the male; the first abdominal segment, which is longer and more convex in the female; the elytra, which are broader, longer and thicker in the female; and the contour of the elytral declivity, which is more abrupt in the female.

The aedeagus is figured for all species except the following, of which no males were seen: *P. longicollis* Champion, *P. defectus* Green, and *P. plumosiventris*, new species. The aedeagus of *Pn. submetallicus* (Schaeffer) is not figured since it is nearly identical to that of *Pn. lucidillus*, new species, which is figured. The genitalia were most readily removed from relaxed specimens by lifting the elytra, softening the dorsal surface of the abdomen for a minute or two with a drop of alcohol, and then teasing out the organs with an insect pin. This procedure was much easier, quicker, and left the specimen in better condition than teasing the genitalia through the anal opening.

TAXONOMY

KEY TO THE GENERA OF PANDELETEINI¹

- | | |
|--|---|
| 1. Apical emargination of beak extending across the entire apex of beak. Fore legs scarcely enlarged | 2 |
| — Apical emargination of beak not reaching sides of beak. Fore legs scarcely to greatly enlarged | 3 |

¹ The genus *Hadromeropsis* Pierce is not included here. See discussion in Leconte and Horn, 1876, p. 81-82; Pierce, 1913, p. 399-401; and comment at the end of this paper.

2. Humeral umbone absent. Epistoma flat, its anterior margin truncate to slightly emarginate. Apical emargination of beak finely carinate*Isodacrys* Sharp
 — Humeral umbone prominent. Epistoma concave, its anterior margin deeply emarginate. Apical emargination of beak keeled*Polydacrys* (Schönherr)
3. Fore legs scarcely enlarged; fore coxae nearly contiguous. Head transversely prominent between or behind eyes*Pandeleiteinus* Champion
 — Fore legs slightly to greatly enlarged; fore coxae distinctly, narrowly to broadly separated. Head flat (except Florida species) or rounded behind eyes
*Pandeleiteinus* Schönherr

Genus *Pandeleiteinus* Champion

Pandeleiteinus CHAMPION, 1911, pp. 206–207.

TYPE SPECIES: *Pandeleitejus submetallicus* Schaeffer, designated by Champion (1911, p. 206).

DISCUSSION: This genus was erected by Champion for *Pandeleiteinus* (spelled "*Pandeleitejus*" by Horn, Fall, and Schaeffer) *submetallicus* Schaeffer, about which Schaeffer said (1908, p. 216), "This little species looks somewhat strange among the other specimens of *Pandeleitejus*, but as it has the principal characters of this genus, I prefer to leave it here at present."

The three new species of *Pandeleiteinus* herein described help to further strengthen and define the genus. The four species of *Pandeleiteinus* [*Pn. submetallicus* (Schaeffer); *Pn. lucidillus*, new species; *Pn. magdalenensis*, new species; and *Pn. elythroplanatus*, new species] exhibit the following generic characters:

Size small, the length under 5 mm. Head transversely prominent between the eyes. Apex of beak flared outward under the scrobes so that the scrobes (but usually not the pregenae) are visible dorsally, and the flange is visible from below (plate 1, fig. 12). Apical emargination of beak broad, never

PLATE 1

Figs. 1, 2, 4 to 6. Lateral view of head and thorax of *Pandeleiteinus* and *Pandeleiteinus*. Fig. 1. *P. henryi*, new species, female. Fig. 2. *P. plumosiventris*, new species, holotype. Fig. 4. *P. robustus* Schaeffer, lectotype. Fig. 5. *P. defectus* Green from Geysers, California. Fig. 6. *Pn. submetallicus* (Schaeffer), female from Westgard Pass Plateau, California.

Fig. 3. Head of *P. plumosiventris*, new species, holotype.

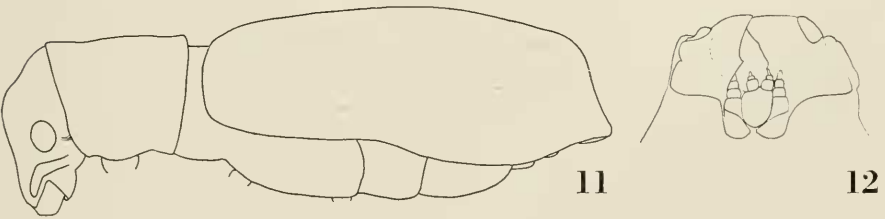
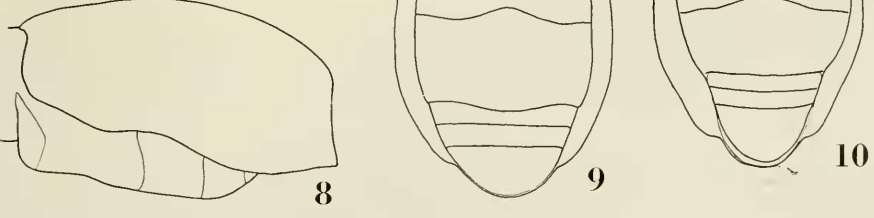
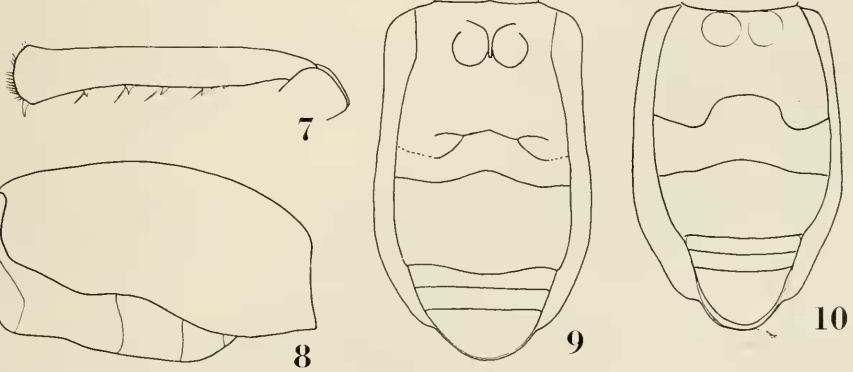
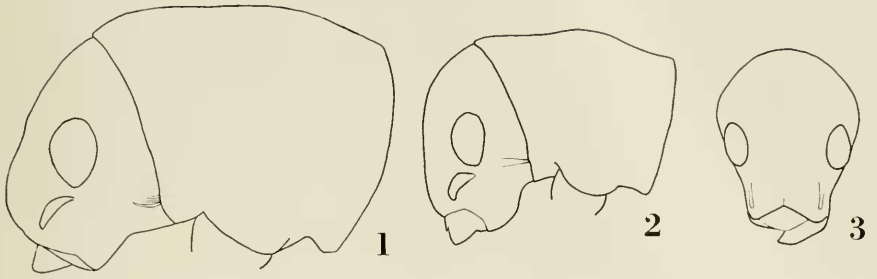
Fig. 7. Fore tibia of *Pandeleiteinus elythroplanatus*, new species, holotype.

Fig. 8. Lateral view of elytra and body beneath of *Pn. magdalenensis*, new species, allotype.

Figs. 9, 10. Ventral view of body beneath elytra of *Pandeleiteinus*. Fig. 9. *Pn. lucidillus*, new species, allotype. Fig. 10. *Pn. magdalenensis*, new species, female.

Fig. 11. Lateral view of *Pn. elythroplanatus*, new species, female.

Fig. 12. Ventral view of mouthparts of *Pn. submetallicus* (Schaeffer).



marked by a strong carina. Apical vertical margins at the sides of the beak deeply triangularly emarginate (plate 1, fig. 6). Scrobes angular, deep, reaching undersurface of beak, distant from eyes. Eyes convex, prominent. Ocular vibrissae well developed. Thorax scarcely produced over head. Elytral striae of deep, small to moderate punctures. Fore coxae nearly contiguous; fore tibiae with two to seven small or minute, widely-spaced teeth on inner edge, often with a bristle at the base of each tooth (plate 1, fig. 7). Fore legs not enlarged. Legs covered with scales like the scales of the dorsal surface. Secondary sexual characters not well expressed; last abdominal segment similar in both sexes. Aedeagus long, slender, gently curved (plate 2, fig. 2).

Champion describes as a generic character, "mentum small, not covering the maxillae." While this is true of *Pn. submetallicus* (plate 1, fig. 12), *Pn. lucidillus*, and *Pn. magdalenensis*, the character is variable and is of specific rather than generic value. The lower part of the maxillae (cardo, stipes, etc.) is usually visible in *Pandeteleius* between the submentum and sides of the beak. The width of the mentum in *Pandeteleius* is sufficiently variable intraspecifically to expose or conceal a considerable area of the maxillae. In *Pandeteleius elythroplanatus*, the mentum is broad apically and translucent on the sides, concealing a larger area of the maxillae than is often concealed in *Pandeteleius*.

Among the species of *Pandeteleius*, *P. cinereus* and *P. subtropicus* bear the closest superficial resemblance to *Pandeteleius*, but are distinct from *Pandeteleius* because the coxae are more widely separated, scrobes are closer to the eye, fore legs are enlarged, and aedeagus is stouter and nearly straight.

The following secondary generic characters are often found in *Pandeteleius*. In the three new species of *Pandeteleius*, a small anterior area on

PLATE 2

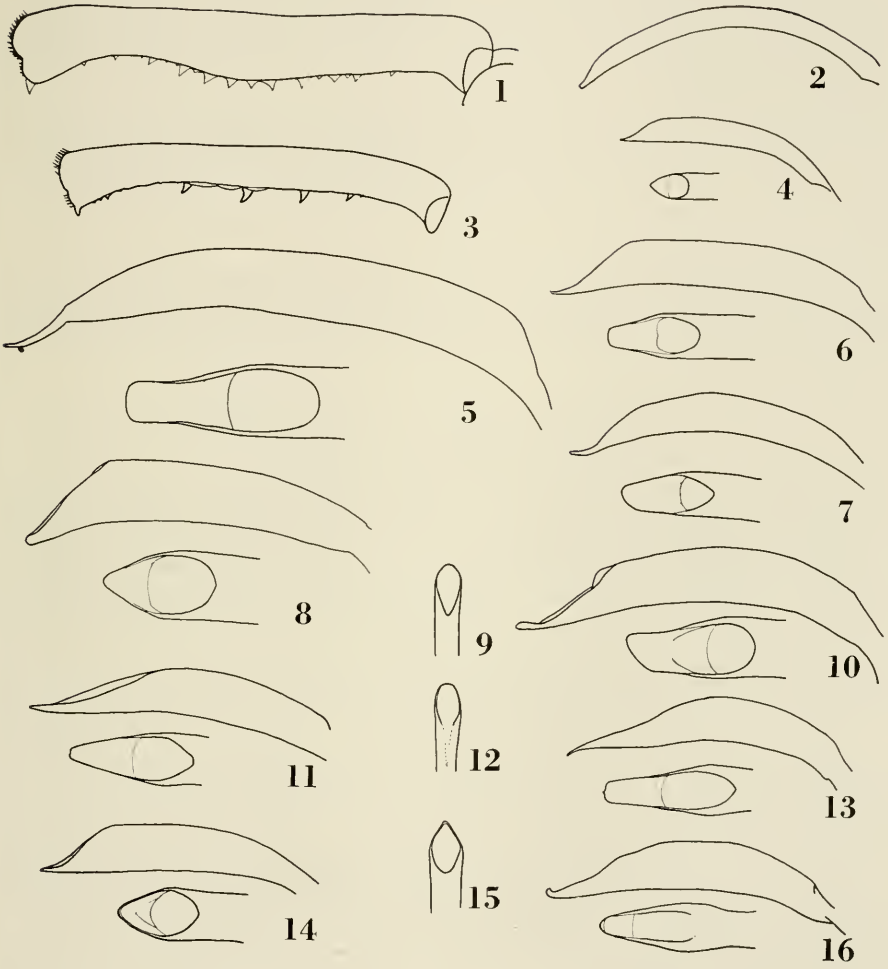
Fig. 1. Fore tibia of *Pandeteleius dentipes* Pierce, paratype.

Fig. 2. Lateral view of aedeagus of *Pandeteleius lucidillus*, new species, holotype.

Fig. 3. Fore tibia of *P. defectus* Green, female from Manitou, Colorado.

Figs. 4 to 8, 10, 11, 13, 14, 16. Lateral view of aedeagus and dorsal view of apex of aedeagus of species of *Pandeteleius*. Fig. 4. *P. subtropicus* Fall from Marathon, Florida. Fig. 5. *P. robustus* Schaeffer from Portal, Arizona. Fig. 6. *P. cinereus* Horn from Kerrville, Texas. Fig. 7. *P. hilaris* (Herbst) from Raleigh, North Carolina. Fig. 8. *P. henryi*, new species, holotype. Fig. 10. *P. dentipes* Pierce, paratype. Fig. 11. *P. simplarius* Fall, topotype from Cloudercroft, New Mexico. Fig. 13. *P. attenuatus*, new species, holotype. Fig. 14. *P. buchanani*, new species, holotype. Fig. 16. *P. rotundicollis* Fall from Portal, Arizona.

Figs. 9, 12, 15. Dorsal view of apex of aedeagus of species of *Pandeteleius*. Fig. 9. *Pn. lucidillus*, new species, holotype. Fig. 12. *Pn. magdalenensis*, new species, holotype. Fig. 15. *Pn. elythroplanatus*, new species, holotype.



the mesosternum often bears close plumose scales instead of the usual scales. The setae along the apical emargination of the beak are more erect than in *Pandeleiteius*. The antennae are seven-segmented. The distance of the scrobes from the eyes is too variable for accurate measurements to be of any value, but the distance is always great. The thorax is often quadrate or broader apically, never with sides strongly rounded. Thorax nearly flat in lateral profile; thoracic constrictions obsolete dorsally, moderate to weak laterally. The sides of the elytra are subparallel, never cuneiform or conspicuously broader than humeri.

The slender, arcuate aedeagus (plate 2, fig. 2) is quite different from the stouter, nearly straight aedeagus of *Pandeleiteius* (plate 2, figs. 4 to 8, 10, 11, 13, 14 and 16). The apices of the genitalia vary interspecifically but less than in *Pandeleiteius*, and the differences are too vague to be readily used taxonomically.

Wickham (1917, p. 470) described *Pandeleiteinus nudus* from a fossil. The description and drawing of this weevil are not sufficiently detailed to be of value here.

KEY TO THE SPECIES OF PANDELEITEINUS OF AMERICA NORTH OF MEXICO

1. Thorax as broad or broader than long. Color metallic green, gold, or blue, or immaculate or nearly immaculate tan. Head large, nearly spherical (plate 1, fig. 6) Southwestern United States.....*Pn. submetallicus* (Schaeffer)
- Thorax distinctly longer than broad. Color brown or black and usually with a distinct pattern. Head transversely prominent between eyes, subcylindrical behind eyes 2
2. Elytra of both sexes two and a half to three times as long as thorax. Dorsal surface of elytra in lateral profile flat, elytra of about equal thickness behind humeri (plate 1, fig. 11). Setae of dorsal surface decumbent, minute, and inconspicuous. Elytra without oblique fasciae. Western Texas, New Mexico, south-eastern Arizona*Pn. elytroplanatus*, new species
- Elytra of female slightly more than twice as long as thorax; elytra of male less than twice as long as thorax. Dorsal surface of elytra in lateral profile arcuate, elytra much thicker apically than behind humeri (plate 1, fig. 8). Setae of dorsal surface recurved and of moderate size. Elytra with oblique fasciae which are not always prominent 3
3. Mature color maculate brown. Margins of elytra gently sinuous, constricted at base of third abdominal segment (plate 1, fig. 10). Middle coxae separated by same distance as fore coxae. Lower California.....*Pn. magdalenensis*, new species
- Mature color maculate piceous. Margins of elytra nearly straight, only slightly indented at base of third abdominal segment (plate 1, fig. 9). Middle coxae slightly more widely separated than fore coxae. Southern Arizona.....*Pn. lucidillus*, new species

Pandeleteinus submetallicus (Schaeffer).

(Plate 1, figs. 6, 12.)

Pandeletejus submetallicus SCHAEFFER, 1908, p. 216. Lectotype female here designated.

Pandeleteinus submetallicus (SCHAEFFER). Champion, 1911, p. 207.

There is a series of six females in the United States National Museum collection bearing the labels "Cotype No. 42476." All were collected in Beaver County, Utah (the only data recorded by Schaeffer); three are labelled June 20, and three are labelled South Creek, June 22. The specimen selected as lectotype is labelled June 20, is in near perfect condition and closely resembles Schaeffer's description.

LECTOTYPE: *Female*, length 3.7 mm., width 1.5 mm.

Color light ferrugineous, covered with metallic green and golden scales. Scales lightly granular; contiguous, but not covering the seta-bearing punctures. Setae of dorsal surface decumbent, minute, and very inconspicuous.

Head large, subspherical (plate 1, fig. 6). Beak short, sides only slightly flared outward under scrobes; genae visible from above, pregenae narrowly visible from above. Fine impressed median line extending from behind anterior margin of eyes to middle of beak. Beak transversely elevated between scrobes. Apex of beak deeply, areuately emarginate. Epistoma narrow, shiny, fuscous, its apical margin asymmetrically indented. Epistoma continuous with beak, i.e., on the same plane and not separated from it by a carina. Scrobes (plate 1, fig. 6) horizontal for a short distance, thence narrower and abruptly diagonal nearly to undersurface of beak; broadest at angle; distant from eyes. Eyes small and round. Antennal club slender and pointed.

Thorax slightly broader than long, broader at apex and middle than at base. Basal constriction narrow, moderate; apical constriction moderate laterally, obsolete dorsally. Base of thorax with small, deep, setate punctures becoming much shallower toward apical constriction.

Humeri prominent; elytra broader at middle. Elytra slightly convex in lateral aspect, declivity gently areuate. Strial punctures moderate, deep, each with a very small seta. Intervals flat, with a row of minute seta-bearing punctures.

The inner edge of each fore tibia with four or five very small teeth obscured by scales, each tooth bearing an oblique fuscous bristle at its base.

Fore and middle coxae very narrowly separated. Posterior margin of

first abdominal segment arcuately emarginate medially. First abdominal segment medially distinctly shorter than the second. Last abdominal segment longitudinally convex medially, flattened laterally, rounded apically. Side margins of elytra rather abruptly constricted at third abdominal segment, thence parallel until broadly rounded at apex.

Other specimens of *Pn. submetallicus* from Beaver and Iron counties, Utah, and the remaining five cotypes are fairly uniform but show the following variations.

The color varies from bright metallic green to yellow green, cupreous tan, and non-metallic beige, the latter color sometimes lightly mottled on elytra. Undersurface metallic green; when upper surface is non-metallic, undersurface has at least a cupreous tint to some scales if not entirely metallic green. Scales often with a vague central pustule. Scales of the elytra indistinctly imbricated posteriorly, on the thorax imbricated apically. Sculpture and imbrication of the scales more evident in non-metallic specimens.

Beak with a small elongate fovea between the anterior margin of eyes, fovea often attenuated into a median line which extends to middle of beak in its maximum expression. Emargination of apex of beak shallow, crescentic to obtusely triangular. Epistoma with apical margin slightly arcuately or triangularly emarginate.

Thorax as broad as long (usually in males only) to much broader than long. Thorax usually broadest at apex, although in some females it is as broad at middle as at apex giving a square outline to thorax instead of the usual cup-shape.

Elytra with sides subparallel; in lateral view, only very slightly convex before declivity in males, more convex in females. Declivity gently arcuate to oblique. Strial punctures sometimes obscured by scales. Alternate intervals sometimes slightly wider in females.

Inner edge of each fore tibia with four to seven obsolete teeth, usually obscured by scales; a prominent fuscous bristle at the base of each tooth, these bristles often abraded or broken.

Secondary sexual characters poorly defined. Posterior margin of first abdominal segment broadly and deeply emarginate in females, less deeply emarginate in males. Last dorsal abdominal segment acutely arcuately emarginate apically in males and conical and with long hairs in females. This segment is not often visible, however. Last ventral abdominal segment usually slightly truncate and deflected at apex in males, slightly longer in females and with the apical margin continuous and not deflected.

Aedeagus much like that of *Pn. lucidillus* with apical opening short, rather rounded.

Utah specimens range in size from 3.4 to 4.4 mm. long, and from 1.3 to 1.8 mm. wide.

Pandeleteinus submetallicus is also found in Nevada, California, Arizona, New Mexico, Texas, and Colorado, and specimens from these places usually vary somewhat from the typical *Pn. submetallicus*.

Colorado specimens are much like the Utah specimens. Both sexes have an overall robustness and central tumescence on the last ventral abdominal segment. Median line on beak frequently impressed. Elytra often quite convex from base, especially in females. Non-metallic females not uncommon. Large series from Glenwood Springs and Paonia, Colorado, range in size from 3.2 to 4.5 mm. long and 1.3 to 1.7 mm. wide.

Southern Arizona specimens present the most extreme variation from typical Utah specimens. Small. Always metallic, light yellow to dark green. Scales not imbricated on elytra; scales irregular, usually angular shapes. Beak with frontal fovea rarely attenuated into median line. *Males*: Thorax more slender; elytra narrower, flatter and more parallel; elytral intervals narrow (sometimes only the width of a scale), more convex; punctures large, deep, and glabrous. *Females*: Differ from males in being slightly more robust, and having elytral intervals flatter and punctures somewhat shallower. These extremes are found in the Chiricahua, Huachuca, Santa Catalina, and Santa Rita mountains. Size ranges in length from 2.7 to 3.9 mm., and in width from 1.1 to 1.5 mm.

Other Arizona specimens (Grand Canyon, Bright Angel, and "Walnut, Arizona Territory") are intermediate between typical Utah and southern Arizona specimens.

Texas specimens are much like southern Arizona specimens. Metallic yellow green to blue green. Elytral punctures usually smaller and intervals less convex than in Arizona specimens. Recorded from Alpine and Davis mountains.

Santa Fe, New Mexico, specimens are smaller than, but have the more robust form of, Colorado specimens. They have the color of Texas specimens, elytra and beak of Colorado specimens. Size varies in length from 3.5 to 3.9 mm., and in width from 1.4 to 1.6 mm.

Nevada and California specimens are similar to Utah specimens; they lack the tumescence of the last abdominal segment found in many Colorado specimens. Some non-metallic males and females with non-metallic under-surface. Thorax often quite square in outline, i.e., apex not broader than middle. Specimens from Austin, Nevada, and many locations in central California to as far south as Los Angeles. Size varies in length from 3.4 to 4.8 mm., and in width from 1.3 to 1.9 mm.

Although *Pandeleteinus submetallicus* now has three congeners, it still "looks somewhat strange among the other specimens . . ." (Schaeffer, 1908, p. 216). Its metallic green, gold, or blue color is unique in the Pandeleteini, and its non-metallic, sometimes vaguely maculate, tan specimens are equally

as striking. Structurally it is distinct by its nearly spherical head, its shiny narrow epistoma, apically short scrobes, thorax as broad or broader than long, and decumbent minute setae of dorsal surface.

Pandeleiteinus submetallicus has been collected from April through August. Juniper is the most common host, but it has also been less frequently taken on pepper grass, manzanita, and at light. Over 380 specimens were examined.

Pandeleiteinus lucidillus Howden, new species.

(Plate 1, fig. 9, plate 2, figs. 2, 9.)

HOLOTYPE: *Male*, length 2.8 mm., width 1.2 mm.

Color black; legs except tarsal claws, scape and first segment of antennae ferruginous; densely clothed with piceous, white, and a few tan scales. Apex of beak white, frons brown, vertex piceous with scattered white scales; sutural interval light, common oblique white fascia over declivity; epipleurae mottled white and tan. Undersurface including sides of beak and thorax immaculate white. Coxae and as much of femora as is covered by body when legs are extended, white, remainder of legs mottled.

Scales faintly granular, contiguous, or with one or more sides overlapped, shapes irregular. Scales of head and beak irregularly imbricated, often convex. Scales of thorax imbricated anteriorly. Scales of elytra with a dull central pustule, imbricated posteriorly.

Setae small, recurved, rather stout, shiny, very inconspicuous except in profile. Light reflecting from the summits of the setae gives the appearance of tiny shiny spots under low magnification.

Beak deflected at approximately a 45° angle from the head. Frons prominent, convex between the eyes, beak becoming flattened apically. Sides of beak subparallel to insertion of antennae thence bulging below scrobes. Median line on beak deeply impressed from between eyes to middle. Apical emargination of beak deep, round, occupying approximately median third. Epistoma rugulose, anterior margin shallowly emarginate, with median indentation. Scrobes deep, angles rounded, separated from eyes by about one-half the length of eye. Eyes subelliptical, nearly evenly convex. Antennal scape does not quite reach middle of eye; first segment of funicle clavate and about one-third longer than the second segment, outer joints subconical; club pointed oval.

Thorax much longer than broad, sides slightly divergent from base to apex, but slightly broader medially. Thorax with moderate punctures becoming obsolete on apex, the punctures obscured by vestiture.

Elytra across humeri approximately 1.4 times the width of apex of thorax. Elytra twice as long as thorax, humeri square. Sides of elytra sub-

parallel, slightly broader at middle, thence gently rounded to apex. Fourth and sixth intervals coalescing and prominent just below apex of declivity. Elytra feebly convex transversely and longitudinally. Declivity at apical sixth, moderate, oblique. Elytral striae of foveate punctures separated by a little more than their own diameter; the elytral intervals scarcely wider than the diameter of the punctures and with a row of sparsely set setae.

Fore tibiae shaped like those of *Pn. submetallicus*, inner edge of each with two small teeth, one minute tooth and three or four long bristles among the suberect hairs which obscure the teeth.

Fore coxae extremely narrowly separated, middle coxae slightly more widely separated. Posterior margin of first abdominal segment broadly, shallowly, arcuately emarginate and deflected. Third, fourth, and last abdominal segments transversely convex, the latter deflected and slightly truncate apically. Ventrally, the margins of elytra nearly straight, scarcely constricted at base of third abdominal segment (plate 1, fig. 9). Entire abdomen and metasternum sparsely set with very small, inconspicuous pale recurved setae which arise from pin-point punctures between the scales.

Aedeagus (plate 2, fig. 2, 9) broadly rounded at apex.

ALLOTYPE: *Female*, length 3.4 mm., width 1.4 mm.

More robust than holotype. Color pattern better defined than in holotype. Beak white; frons and vertex light brown with dark brown median line; white patch on occiput either side of midline. Thorax with a broad white vitta on either side of dark median line. White scutellar vitta well defined along first, second, and third intervals at base, gradually diffusing to piecous oblique fascia which borders anteriorly the common white oblique fascia at declivity; the latter fascia extended anteriorly along third and fifth intervals. Epipleurae and undersurface as in holotype. Scales and setae as in holotype.

Beak as in holotype, but median impressed line ends anteriorly in a transverse pit; anterior margin of epistoma truncate with median indentation. Antennal club slightly broader and shorter than in type.

Thorax with sides straighter than in type. Elytra 2.2 times length of thorax. Elytra with sides as nearly parallel as in holotype, but more convex posteriorly in longitudinal axis; declivity more nearly vertical. Elytral intervals about one-half wider than in holotype.

Legs as in holotype; coxae as narrowly separated. Posterior margin of first abdominal segment similar to that of holotype. Last abdominal segment not as strongly deflected at apex; margin at middle of sides slightly flattened; scales not quite reaching margin where they are replaced by a row of two- and three-branched setae. Margins of elytra when viewed ventrally (plate 1, fig. 9) similar to those of holotype.

Holotype, male, Sycamore Canyon, N. of Baboquivari Canyon, W. side of Baboquivari Mts., Pima County, Arizona, July 27, 1952, H. B. Leech & J. W. Green (CAS). Allotype, female, same data as male (CAS). Paratypes: 18 males, 26 females as follows: *ARIZONA*: 1 female, same data as type; 1 male, 1 female, Pima County, July 12, 1915, E. L. Sleeper Collection; 3 females, Comobabi Mts., August 9-10, 16, 32° 2'N, 111° 45'W, about 3425 ft.; 1 male, 1 female, Black Dike Prospect, Sierritas, July 26-29, 1916; 5 males, 6 females, Baboquivari Canyon, W. side of Baboquivari Mts., Pima County, July 25-27, 1952, H. B. Leech & J. W. Green; 1 male, 2 females, Baboquivari Mts., F. H. Snow, in R. Hopping Collection; 1 male, Brown's Canyon, Baboquivari Mts., at light, August 17, 1955, G. D. Butler & F. G. Werner; 1 male, Brown's Canyon, Baboquivari Mts., June 27, 1957, Mesquite; 1 male, Santa Rita Mts., April 5, Hubbard & Schwarz; 1 female, Santa Rita Mts., August 14, 1940, Van Dyke Collection; 2 females, Tucson, May 18, 1953, A. & H. Dietrich; 1 female, Pima Canyon, Santa Catalina Mts., August 23, 1913, W. D. Pierce; 2 females, Sabino Canyon, Santa Catalina Mts., Pima County, June 15, 1957, Mesquite; 2 females, Esequela, June 10, 1942, A. W. Ford, in E. L. Sleeper Collection; 1 male, 2 females, Dry Canyon, Sands Ranch, S. E. end Whetstone Mts., Cochise County, August 10, 1952, H. B. Leech & J. W. Green; 1 female, Rincon Mts., September 15, 1937, R. Floek; 4 males, Huachuca Mts., altitude 5000, June 14, 1928, A. A. Nichol, in R. Hopping Collection; 1 male, 1 female, Tombstone, June 26, 1940, R. A. Floek; 1 male, 1 female, 14 mi. E. Oracle, July 27, 1924, E. P. Van Duzee.

Paratypes are in the following collections: AMNH, CAS, CNC, CU, MCZ, USNM, UA, Bottimer, Howden, Sleeper.

Male paratypes vary in length from 2.8 to 3.2 mm., and in width from 1.0 to 1.2 mm. Female paratypes vary in length from 3.0 to 3.8 mm., and in width from 1.2 to 1.4 mm. Variation in the type series is moderate. The color is always piceous in mature specimens and the distinctive color pattern is constant although obscured to various degrees by scattered white scales. The beak bears some variable characters. The median impressed line may be reduced to an elongate pit between the eyes. The apex of the median line often ends in a short transverse pit and the area around it is often shallowly depressed; the presence of the transverse pit rather than a simple fovea is not correlated with the length of the median line. The apex of the beak is deeply punctate in a few specimens. The width of the dorsal surface of the beak is slightly variable; the pregenae are narrowly visible dorsally in one female. The emargination at the apex of the beak is variable in shape; in several specimens it is bluntly triangular and in at least one male the emargination is conspicuously narrower. The emargination of the epistoma is similar to that of the type in the majority of specimens, but in two females is very deeply triangular. The antennal club is usually pointed oval as in

the holotype; the shorter, stouter club noted in the allotype is not correlated with sex. The thorax is quite uniform.

The elytra vary in several respects. The declivity is oblique in most males and vertical or nearly so in most females, although there is too much overlap in this character to accurately sex specimens. Large deep elytral punctures and narrower intervals are usually indicative of males, as smaller, shallower punctures and wider intervals usually indicate females, but, as in the contour of the declivity, the characters are not reliable enough for sex determination.

The fore tibiae each bear two to five teeth; in one specimen a middle tooth bears two smaller accessory teeth. The branched setae noted on the last abdominal segment of the allotype were present in some males as well as in some females.

This species was sometimes misidentified in collections as *P. cinereus* from which it is immediately distinguishable by its closer coxae and parallel-sided elytra. From other species of *Pandeteinus* it is distinguished by having the setae recurved, color piceous with broad white median vitta on the thorax, and elytra roughly twice as long as thorax. From *Pn. magdalenensis* it is distinguished by having the fore coxae more narrowly separated, the declivity not produced at the summit, and the elytral margins straighter and not constricted at the base of the third abdominal segment.

There is one specimen of *Pandeteinus* in the California Academy collection from 25 miles south of Santa Rosalia, Lower California, which is approximately in the center of the East Coast. This specimen is a female 3.5 mm. long and 1.4 mm. wide and is quite close to *Pn. lucidillus*. It is not included in the type series, however, because of its much broader thorax and distant locality. The distance between the localities may be insignificant, though. Van Dyke (1942, p. 97-98) found that in Buprestidae, species occurring along the dry eastern part of Lower California (such as the specimen in question) belonged to the Sonoran fauna and thereby often had counterparts in southwestern Arizona (the type locality of *Pn. lucidillus*).

Pandeteinus magdalenensis Howden, new species.

(Plate 1, figs. 8, 10, plate 2, fig. 12.)

HOLOTYPE: *Male*, length 2.7 mm., width 1.2 mm.

Color light ferrugineous, covered with white, medium brown and a few beige scales. Head and beak mottled, sides of beak and around eyes white; prothorax with an indistinct, broad, white median vitta, the rest of the disc immaculate medium brown to middle of sides where it meets the white of the undersurface. Elytra indistinctly marked, with white oblique fascia

above declivity. Undersurface immaculate white with basal half of femora white, remainder of legs mottled.

Scales of head and beak contiguous or nearly so, completely margined, imbricated posteriorly along median line, slightly granular, some with an indistinct central pustule. Scales of thorax mostly not quite contiguous, otherwise as on head. Scales of elytra mostly imbricated posteriorly.

Setae of dorsal surface short, recurved, broad, narrowed apically; inconspicuous except in lateral profile; setae of thorax smaller and less conspicuous than those of head.

Beak with dorsal surface flat in lateral profile; sides parallel from eyes to scrobes, flared outward under scrobes. Median impressed line beginning in slight depression at middle of beak, shallow and ending just beyond anterior margin of eyes. Apical emargination of beak moderately round; anterior margin of epistoma truncate with median indentation. Eyes rounded in outline, unevenly convex, more strongly convex ventrally. Scrobes with apical horizontal portion short, broad; more abruptly bent than in *Pn. lucidillus*.

Thorax 0.85 times as wide as long, base as wide as apex, sides slightly arcuate between basal and apical constrictions which are weak but distinct dorsally and laterally. Thorax with small punctures which become obsolete on apex.

Elytra across humeri approximately 1.5 times width of apex of thorax. Elytra twice as long as thorax, humeri square. Sides of elytra subparallel, slightly broader at middle, thence diagonal to apex. Elytra in lateral profile flattened to declivity which is at apical fourth; declivity nearly vertical, obsolete produced at summit, profile slightly concave. Elytral striae with medium sized, deep punctures separated by a little more than their own diameter. Elytral intervals slightly convex, more than twice the width of the punctures and with a row of sparsely set setae. Fourth and sixth intervals coalescing and prominent below summit of declivity as in *Pn. lucidillus*, but not as noticeable in dorsal profile owing to more abrupt declivity.

Fore legs more robust than in *Pn. lucidillus*; inner edge of each fore tibia with four small sharp teeth obscured by slender pale hairs. Outer surfaces of legs with recurved setae; setae of inner surfaces straighter, finer.

Fore coxae narrowly but distinctly separated; middle coxae separated by same distance. Posterior margin of first abdominal segment broadly, shallowly, arcuately emarginate and deflected medially. Third and fourth abdominal segments transversely convex. Last abdominal segment convex and deflected apically. Margins of elytra gently sinuous, strongly constricted at base of third abdominal segment, thence horizontal, subparallel to last abdominal segment. (Female, plate 1, fig. 10).

Apex of aedeagus (plate 2, fig. 12) broadly rounded. Aedeagus quite soft, possibly injured medially in extraction.

ALLOTYPE: *Female*, length 3.2 mm., width 1.4 mm.

Head and frons to anterior margin of eyes medium brown with an indistinct median spot on vertex. Beak white along median line; scales of apical half with a feeble red or green iridescence; sides and a ring around eyes aqua (see remarks in Procedures on this color). Prothorax with a broad white median vitta interrupted along median line, otherwise as in type. Elytral markings more sharply defined than in holotype but still with some mottling; humeri white, white vittae of pronotum extending to basal fourth of elytra, oblique white fascia above declivity distinct, its anterior margin irregular. Undersurface with pale bluish-green scales instead of white ones, last three abdominal segments light brown. Scales as in type except along elytral suture and on declivity where they are quadrate and distinctly pustulate.

Median impressed line of beak ending apically in slightly transverse depression. Anterior emargination of beak more obtusely triangular than in type. Anterior margin of epistoma truncate with asymmetrical indentation. Eyes nearly evenly convex; serobes as in holotype.

Thorax 0.92 times as wide as long, slightly wider at apex than at base, dorsal surface flatter than in holotype. Base of elytra arcuately emarginate. Elytra broader at middle and more convex (plate 1, fig. 8) than in holotype. Elytral intervals slightly wider than in holotype. Left fore tibia with three teeth, right tibia with four teeth. Fore coxae separated by same distance as middle coxae. Abdomen (plate 1, fig. 8), especially second segment, more tumid than in holotype. Last abdominal segment flatter than in holotype, margins flat, not deflected. Margins of elytra (plate 1, fig. 10) as in holotype.

Holotype, male, San Domingo, L. Cal., July 19, 1938, Ross and Michelbacher Collectors (CAS). Allotype, female, same data as holotype (CAS). Paratypes: 5 females. 4 females same data as type. 1 female, 15 mi. N. El Refugio, L. Cal., July 4, 1938, Ross and Michelbacher Collectors.

Paratypes are in the following collections: CAS, USNM, Howden.

The five paratypes are all females and are quite uniform except for the beak, their few variations falling within the range of the holotype and allotype. Size ranges from 3.0 to 3.3 mm. in length and from 1.3 to 1.4 mm. in width. Scales of the thorax are mostly contiguous. The median impressed line of the beak is always very fine and is obsolescent in the El Refugio specimen. None of the specimens have the dark stout setae at the bases of the tibial teeth which are frequently present in other species of *Pandeleteinus*.

Pandeleteinus magdalenensis is closely related to *Pn. lucidillus* and differs from it by its brown rather than piceous color, broader separation of fore

and middle coxae, more robust form, by having the declivity obsolete produced at the summit and slightly concave in profile, and by having the margins of the elytra strongly constricted at the base of the third abdominal segment.

Pandeleteinus magdalenensis occurs in southern Baja California while *Pn. lucidillus* occurs in southeastern Arizona. The country between the two regions, however, has been poorly collected, and the range of each species may be much greater than the specimens at hand indicate.

This species is named *Pn. magdalenensis* after the Magdalena Plain in Lower California on which are situated the localities of San Domingo and El Refugio (see Michelbacher and Ross 1942, p. 10).

Pandeleteinus elythroplanatus Howden, new species.

(Plate 1, figs. 7, 11, plate 2, fig. 15.)

HOLOTYPE: *Male*, length 3.2 mm., width 1.2 mm.

Color fuscous; legs, antennae, apex of abdomen, and apex of beak ferruginous; clothed with light brown, fuscous and off-white scales. No distinct color pattern. Head and beak mostly light brown, sides of head and ring around eyes white. Thorax mostly light brown, indistinctly darker medially, whitish vitta along middle of sides. Elytra mostly fuscous, with base and suture light brown, some whitish scales scattered over all, especially on the sides. Entire undersurface immaculate whitish, with legs from coxae to middle of femora whitish, thence light brown. A few bluish gray scales scattered among the white ones.

Scales of dorsal surface small, not margined, often rounded in shape, mostly contiguous, granular and usually with a central pustule. Scales at apex of beak convex, mostly smooth and shiny, opalescent. Some of the scales, particularly the white scales along sides of thorax and elytra, very finely margined. Scales of undersurface smooth to granular; scales of third and fourth abdominal segments ovate, loosely imbricated. Setae of dorsal surface minute, decumbent, extremely inconspicuous.

Dorsal surface of beak slightly narrowed anteriorly, vaguely sinuate in lateral profile (plate 1, fig. 11) and thinner dorso-ventrally than in other species of *Pandeleteinus*. Transverse frontal prominence less pronounced than in *Pn. magdalenensis* and *Pn. lucidillus* and centered over posterior half of eyes instead of middle of eyes, which contributes to the characteristically longer, slightly sinuate habitus of the beak. Beak with median impressed line absent, but with a slight fovea between anterior margin of eyes and a slight concavity medially. Apical emargination of beak obtusely triangular and occupying roughly two-thirds of apical margin. Epistoma shiny, slightly rugulose, anterior margin obtusely triangularly

emarginate. Mandibular sears conspicuous. Setae of beak and frons recurved and slightly larger and more evident than the setae of the rest of the body. Scrobes deep, wide, arcuate. Eyes hemispherical, larger and more prominent than in other species of *Pandeteinus*. Antennal club lanceolate, somewhat flattened.

Thorax distinctly longer than broad, scarcely produced apically, apex as wide as base. Sides gently rounded between constrictions which are at basal and apical fourths and slightly visible in lateral profile. Thoracic punctures very small and inconspicuous, each having a minute seta.

Elytra across humeri approximately 1.5 times width of thorax at apex. Elytra 2.5 times as long as thorax; humeri square. Sides of elytra nearly parallel to just before middle thence gently convergent to declivity which is at apical sixth. Elytra in lateral profile (plate 1, fig. 11) flat on disc, only very slightly thicker apically than basally; body through metathorax not much thicker than through last abdominal segment. Declivity oblique, its summit slightly produced and rounded. Elytral striae composed of medium glabrous punctures separated by at least their own diameter and each bearing a minute seta. Elytral intervals slightly convex, approximately three times the diameter of the punctures, sparsely set with setae which are no larger than the ones in the punctures. Fourth and sixth intervals not produced where they coalesce apically.

Fore legs longer, fore femora slightly stouter than the other legs. Left fore tibia with three, right fore tibia (plate 1, fig. 7) with four small sharp teeth on inner edge, each tooth with a stout erect bristle arising from its base and with scattered minute serrations between the teeth. The inner edges of the fore tibiae bear only a few fine suberect or decumbent long hairs; outer edges of fore legs with small recurved setae. Meso- and metathoracic legs moderately set with pale decumbent or suberect setae.

Fore and middle coxae very narrowly separated. Posterior margin of first abdominal segment broadly arcuately emarginate. First abdominal segment medially subequal to the second. Third and fourth abdominal segments nearly flat. Last abdominal segment long, nearly flat, completely margined, apex briefly truncate and slightly deflected.

Aedeagus (plate 2, fig. 15) with apical opening broadly lanceolate, pointed at apex.

ALLOTYPE: *Female*, length 3.9 mm., width 1.6 mm.

Color as in holotype but lighter throughout; legs and antennae almost testaceous. Vertex with a fuscous spot. Thorax with a broad, median, fuscous vitta; sides broadly white. Elytra and undersurface colored much as in type.

Scales of dorsal surface contiguous, those of elytra with margins finely,

obsoletely raised and obsoletely imbricated posteriorly. Setae more evident than in holotype, but not larger.

Dorsal surface of beak narrowed medially, flared slightly outward apically. Head more robust than in holotype, pregenae narrowly visible from above. Shallow median impressed line on basal third of beak. Apical emargination of beak ogival and occupying slightly more than one-third of the apical margin. Epistoma shallowly triangularly emarginate apically. Scrobes bent at slightly more than a right angle. Antennal club not noticeably flattened.

Thorax with sides nearly straight. Elytra slightly broader at middle, approximately three times as long as thorax. Deelivity in profile slightly concave medially. Metathorax and first two abdominal segments swollen so that body is much thicker through those parts than through last abdominal segment. Strial punctures inconsiderably smaller than in holotype; elytral intervals broader than in holotype.

Fore tibiae each with four or five small teeth on inner edge. Fore coxae very narrowly separated, middle coxae widely separated. Posterior margin of first abdominal segment more roundly emarginate. First abdominal segment medially much shorter than second segment. Last abdominal segment very similar to that of holotype except for extreme apex which is rounded and not deflected.

Holotype, male, near Presidio, Texas, April 5, 1948, Presidio-2298, J. H. Russell, *Condalia lycioides*, 48-15436 (USNM). Allotype, female, Presidio, Texas, April 4, 1945, J. H. Russell, on *Pluchea sericea*, 45-7140 (USNM). Paratypes: 38 males, 47 females, as follows: ARIZONA: 2 males, 1 female, Chittenden; 2 males, Morrison, Hubbard & Schwarz; 2 males, 2 females, Sunglow, June 15, 1942, A. W. Ford. NEW MEXICO: 1 male, 3 females; 4 males, 9 females, 8315; 3 males, 8315, Horn; 1 male, 70; 1 male, J. B. Smith Collection; 1 female, Mesilla Park, C. N. Ainslie, Webster no. 5042; 1 female, Loving, J. W. MacSwain; 1 male, La Luz Canon, April 18, 1902, Van Dyke Collection; 1 male, 3 females, Hidalgo County, June 9, 1945, C. T. Winslow, in E. L. Sleeper Collection. TEXAS: 3 males, 4 females, El Paso, April, May, A. Fenyes Collection; 1 male, Pecos, May 14, 1927, J. O. Martin; 6 males, 7 females, same data as holotype; 9 males, 8 females, Presidio, April 4, 1945, J. H. Russell, on *Prosopis* foliage, 45-9703; 1 female, same data as allotype; 1 male, 1 female, Presidio, April 25, 1949, J. H. Russell, on *Condalia lycioides*, 49-11631; 1 female, Presidio, April 17, 1944, on *Prosopis* sp. flowers, Lot no. 44-10899; 1 female, Presidio, May 7, 1944, J. H. Russell, on *Atriplex canescens* flowers, 44-22680; 2 females, Sheffield, April 24, 1924, J. O. Martin; 2 females, Terlingua, Brewster County, May 6, 1927, J. O. Martin.

Paratypes are in the following collections: CAS, CNC, CU, INHS, USNM, Howden, Sleeper.

Male paratypes vary in length from 3.0 to 4.1 mm. and in width from 1.1 to 1.5 mm. Females vary in length from 3.1 to 4.5 mm. and in width from 1.3 to 1.7 mm. Length is far less indicative of sex in *Pn. clytroplanatus* than it is in most species of *Pandeteius* or *Pandeteinus*.

Overall color of the paratypes varies from cinereus to piceous. The color pattern is almost obliterated in some specimens by an abundance of white scales, but the gross pattern is usually discernible macroscopically: dark median vitta on thorax, each elytron with indistinct dark median vitta entered by scattered clusters of white scales. The absence of any oblique fasciae is notable. All of the scales on a specimen may be without the central pustule and with or without very fine margins. In some specimens finely margined scales are indistinctly imbricated anteriorly on the thorax and posteriorly on the elytra.

The median impressed line of the beak varies from obsolete to distinctly but finely impressed on the basal half of the beak; it is more often well expressed than not. The apical emargination of the beak varies from almost semicircular to sharply triangular. The apical margin of the epistoma varies from truncate with a small median indentation to deeply triangularly emarginate. The scrobes are quite variable, ranging from evenly arcuate to sharply angular (never quite right-angled), the horizontal portion always shorter than the vertical portion, but sometimes subequal.

Thorax subquadrate, with sides nearly straight to distinctly rounded between constrictions. The dark and light vittae of the thorax contribute to this quadrate habitus.

The fore tibiae each bear three to six small sharp teeth with stout pale or dark bristles at their bases. The form of the fore tibia is more clearly delimited than in *Pn. magdalencensis* and *Pn. lucidillus* because of the fewer and finer setae. The legs or just the femora are sometimes slightly bowed downward.

The last abdominal segment is also only slightly different in the two sexes. The metathorax and first two abdominal segments are "swollen" in both sexes, but more so in females. This gives the female a very different profile from that of the male where the abdominal segments are nearly flat and more nearly on the same plane. Females also tend to have wider elytral intervals, more widely separated middle coxae, longer second abdominal segment usually strongly deflected posteriorly, and more nearly vertical declivity.

In collections this species was frequently labelled *Pandeteius cinereus* Horn, and was also variously labelled, "LeConte say it a n. sp.," "Sitones n. sp.," and "*Pandeteius* n. sp." More than the other species of *Pandete-*

teinus, this one approaches *Pandeleiteius* in its slightly stouter fore femora and its frontal prominence, which is centered over the posterior margin of the eyes instead of the middle of the eyes. But it clearly belongs to *Pandeleiteius* in all of its generic characters.

Pandeleiteius elythroplanatus is quite distinct and may be separated from the other forms of *Pandeleiteius* by its characteristic elytra which are 2.5 to 3 times longer than the thorax, flat dorsally and of nearly equal thickness; minute and inconspicuous dorsal setae; and linear color pattern.

The known range of *Pandeleiteius elythroplanatus* overlaps the southeastern part of the range of *Pn. submetallicus* and is farther east than the ranges of *Pn. magdalenensis* and *Pn. lucidillus*. Its range extends from Sheffield, Texas, southwest to Terlingua, and northwest to Pecos, Texas; north and west to Loving and La Luz Canon, New Mexico; and into Arizona. Its presence at El Paso, Presidio, and Terlingua, Texas border towns, indicates that it undoubtedly occurs in Mexico also. All of the specimens were collected in April and May. The time of mating is indicated by an April 4 female from Presidio with male genitalia broken off in it.

The large series of specimens from Presidio was collected on the following hosts: *Condalia lycioides*, *Prosopis* sp. flowers and foliage, *Pluchea sericea*, and *Atriplex canescens* flowers.

Genus *Pandeleiteius* Schönherr

Pandeleiteius SCHÖNHERR, 1834, p. 129. CHAMPION, 1911, pp. 185-206, 2 pls. PIERCE, 1913, pp. 402-404.

Pandeleitejus HORN (in Leconte and Horn), 1876, pp. 86-87. FALL, 1907, pp. 262-264. SCHAEFFER, 1908, pp. 215-217.

TYPE SPECIES: *Pandeleiteius hilaris* (Herbst) (= *P. pauperculus* Gyllenhal), designated by Schönherr.

Although the genus *Pandeleiteius* has been characterized by several of the above authors, an amended definition seems appropriate to take into consideration the four new species added and the two species removed from the genus, *Pn. submetallicus* (Schaeffer) and *Hadromeropsis opalinus* (Horn) (= *P. viridissimus* Van Dyke).

Size small to moderate, length 2.9 mm. to 7.4 mm. Head rounded or flattened. Beak with apical emargination deep to shallow; epistoma truncate to emarginate or produced over the mandibles, the latter being the case when the beak is deflected at apex. Anterior vertical margin at sides of beak not deeply triangularly emarginate (plate 1, figs. 1, 2, 4, 5). Apex of beak not flared outward under serobes so that the flange is visible ventrally (except possibly in *P. rotundicollis* Fall). Serobes deep, usually not reaching undersurface of beak, often quite close to eyes. Antennal funicle seven-segmented except in *P. defectus* Green and *P. rotundicollis* Fall where it is

variable. Thorax with sides arcuate, constricted at base, and often constricted at apex; never truncate apically. Thorax with ocular vibrissae well developed (except in *P. subtropicus*), usually arising from a small tooth or knob. Fore legs elongate, fore femora often greatly enlarged. Fore coxae distinctly, although sometimes narrowly, separated. Aedeagus (plate 2, figs. 4 to 8, 10, 11, 13, 14, 16) stout, gently arcuate or nearly straight. Secondary sexual characters often strongly expressed. Last abdominal segment of male truncate, not margined at apex; last abdominal segment of female rounded at apex, completely margined, often with oblique pits or depressions each side of middle at base.

In addition to the characters discussed in the Procedure, secondary sexual characters are also occasionally found in *Pandeleiteius* as follows: head and beak more robust in the female; setae on the crest of the elytral declivity more prominent in the female; fore coxae in relation to the middle coxae more widely separated in the female; hind tibiae spatulate in the male.

The species of *Pandeleiteius* of the United States and Canada readily fall into five related groups. The groups are briefly characterized here only to give the reader a conspectus of the genus. The *P. cinereus* group relates *Pandeleiteius* to *Pandeleiteinus*, and the *P. rotundicollis* group relates *Pandeleiteius* to *Hadromeropsis*. The species are listed below in the order in which they are described in the text.

P. cinereus group

P. cinereus Horn

P. subtropicus Fall

Scales strongly margined and reticulate. Fore coxae widely separated. Fore legs scarcely enlarged; fore tibiae short and straight. Size small, 2.9 to 4.4 mm.

P. simplarius group

P. buchanani, new species

P. simplarius Fall

Hind tibiae of male spatulate. Head broad; beak roughly conical, conspicuously narrowed anteriorly so that the scrobes and pregenae are broadly visible from above.

P. robustus group

P. robustus Schaeffer

P. henryi, new species

P. plumosiventris, new species

Hind and middle tibiae of both sexes with flattened scaleless area on inner surface (*P. plumosiventris* males are unknown, and their hind tibiae may be spatulate; in this event, it would belong in the *P. simplarius* group.) Antennal scrobes very short. Eyes large, not very convex.

P. hilaris group*P. hilaris* (Herbst)*P. dentipes* Pierce*P. defectus* Green*P. attenuatus*, new species

Beak deflected at apex, epistoma produced over mandibles. Fore legs moderately enlarged.

P. rotundicollis group*P. rotundicollis* Fall*P. longicollis* Champion

Beak long, parallel-sided, sides vertical. Apical emargination of beak deeply triangular; anterior margin of epistoma triangularly emarginate. Thorax scarcely produced apically. Fore femora greatly enlarged, fore tibiae very slender.

KEY TO THE SPECIES OF PANDELETEIUS
OF AMERICA NORTH OF MEXICO

1. Fore legs scarcely enlarged. Inner surface of hind tibia unmodified, covered with scales to apex. Apical margin of epistoma truncate with small indentation or triangular emargination 2
- Fore legs moderately to greatly enlarged. Inner surface of hind tibia spatulate or with flattened area near apex smooth, shiny, without scales and often with numerous long hairs. Apical margin of epistoma truncate, produced or emarginate 3
2. Beak with swelling over scrobes extending diagonally towards median line; sides of beak broadly rounded. Color predominantly cupreous, thorax with broad whitish vitta. Southern Florida, Lower California *P. subtropicus* Fall
- Beak flat, quadrate; sides of beak perpendicular. Color predominantly gray, thorax with dark fusiform vitta. Texas, southern Oklahoma; Nuevo Leon, Mexico *P. cinereus* Horn
3. Apex of beak deeply, acutely triangularly emarginate. Anterior margin of epistoma deeply triangularly emarginate. Beak long and thin; pregenae and scrobes very narrowly or not visible from above 4
- Apex shallowly, obtusely triangularly or arcuately emarginate. Anterior margin of epistoma produced or with slightly asymmetrical indentation. Pregenae and scrobes broadly visible from above 5
4. Fore femur with a short groove for the reception of the tibia on inner edge near apex, which is marked dorsally by a crescentic projected margin. Color fuscous marked with light scales. Southern Arizona to western Texas; Mexico *P. rotundicollis* Fall
- Fore femur without tibial groove or projected margin. Color beige immaculate or with a few faint brown dots on elytra and light brown median line on thorax. Eastern Texas; Mexico *P. longicollis* Champ.

- 5. Apical constriction of thorax absent or obsolete on disc; scales of thorax not margined, finely granular 6
- Apical constriction of thorax evident on disc; scales of thorax margined or not, finely or coarsely granular or reticulate 7
- 6. Elytra convex from extreme base; humeri inconspicuous. Hind tibia of male strongly spatulate. Apical margin of epistoma truncate with asymmetrical indentation. Cloudercroft, New Mexico; Chisos Mountains, Texas.....
.....*P. simplarius* Fall
- Elytra swollen behind humeri, humeri prominent. Hind tibiae of male similar to those of female, not spatulate, only slightly flattened apically. Apical margin of epistoma bluntly produced beyond apex of beak. Southeastern Arizona.....
.....*P. henryi*, new species
- 7. Fore tibia distinctly curved inward at apex. Scrobes very short, or long and arcuate. Hind tibiae of male (where known) not spatulate 8
- Fore tibia short, straight. Scrobes strongly angular, passing close to eye, and nearly reaching undersurface of beak. Hind tibiae of male spatulate. Southeastern Arizona, western New Mexico*P. buchani*, new species
- 8. Tuft of two to four erect white setae at base of fifth elytral interval. Alternate intervals one, three, and five more convex and with a row of broad recurved setae; intervals two, four and six flattened and scarcely setate. Last abdominal segment in female with numerous finely plumose and branched setae in addition to the long slender hairs. Male unknown. Southeastern Arizona; Sonora, Chihuahua, and Durango, Mexico*P. plumosiventris*, new species
- Without tuft of erect setae at base of fifth interval. Alternate intervals scarcely more convex, if at all; all intervals with slender setae. Last abdominal segment without plumose or branched setae, and with at least a few scales 9
- 9. Fore legs greatly enlarged. Eyes large, oval, only slightly convex. Southeastern Arizona and Mexico*P. robustus* Schaeffer
- Fore legs moderately enlarged. Eyes small, rounded, hemispherical 10
- 10. Fore tibiae dentate on inner edge. Setae of dorsal surface shorter, often stout and less conspicuous 11
- Fore tibiae without teeth on inner edge, but serrate at apical curved edge. Setae of dorsal surface long, very slender. Southern Arizona, western New Mexico*P. attenuatus*, new species
- 11. Inner edge of fore tibia sinuate (plate 2, fig. 1). Elytra very narrow across humeri, humeri obsolescent. South-central and western Texas.....
.....*P. dentipes* Pierce
- Inner edge of fore tibia straight nearly to apex. Elytra broad across humeri; humeri prominent, square 12
- 12. Inner edge of fore tibia with 7 to 14 small, equal teeth, sometimes with minute teeth interspersed between them. Scrobe arcuate, of even thickness. Eastern and central United States and southern Ontario*P. hilaris* (Herbst)
- Inner edge of fore tibia (plate 2, fig. 3) with 4 to 7 widely separated, conspicuous teeth, with very few or no serrations between them. Scrobe angular, wider at angle. Chisos Mountains, Texas; northern New Mexico and Colorado to "Gey-sers," California*P. defectus* Green

Pandeleteius cinereus Horn.

(Plate 2, fig. 6.)

Pandeleteius cinereus HORN (in LeConte and Horn), 1876, p. 87.

Color dark gray to brown, composed of off-white, tan and dark brown scales. Overall color slightly mottled, sometimes with dark median vitta on thorax dilated just below middle; disc of elytra with two dark oblique fasciae, one before and one behind middle, each bordered caudally with light scales.

Scales of the head and beak with raised margins and raised lines giving them a reticulate appearance. Scales of the disc of elytra and thorax sometimes like those of head, but often with raised margins and raised granules; the scales of the thorax sometimes graded between the two types. In these areas of intergradation, the reticulation appears to develop from the granules coalescing.

Beak with dorsal surface flat, sides subparallel, abruptly perpendicular, with genae only slightly visible from above. Median line impressed from between eyes (not originating in a fovea) to apical third, gradually becoming carinate to tip (carina sometimes obscured by scales). Emargination at apex of beak strong, roughly a right-angled triangle. Anterior margin of epistoma truncate with tip of beak, with a median or off-center emargination varying from a slight notch to deep triangle. Scrobes strongly curved, descending well below eyes. Eyes oval. Antennal club short and stout; scape almost reaching posterior margin of eyes.

Thoracic constrictions moderate, only slightly evident in lateral profile. Apical constriction at the apical third of the thorax medially; the basal constriction at the basal sixth. Thorax longer than wide, widest at or just below middle, apex broader than base, sides gently arcuate between constrictions. Punctures rather large and deep, absent above apical constriction.

Elytra with humeri moderately prominent, rounded. Elytra roughly 2.2 times as long as thorax; swollen behind humeri in both sexes, only slightly more so in female than in male. Declivity nearly vertical, rounded at summit. Sutural, second and fourth elytral intervals more strongly convex, especially at declivity. Intervals with a row of broad decurved setae. Fifth interval prominent at its termination below summit of declivity.

Fore femora moderately enlarged. Fore tibiae nearly straight, about as long as femur, with four to six acute teeth on inner edge.

Fore coxae broadly separated, slightly more widely separated in female than in male.

Sexual characters moderately developed; hind tibiae unmodified, similar in both sexes. Length of second segment of abdomen in relation to third and fourth segments combined, relatively greater in female than in male.

Males: Length 3.3 to 3.7 mm., width 1.3 to 1.5 mm. Last segment of

abdomen truncate, declinate, and with the margin obscure at the apex. Aedeagus with apex attenuate and truncate (plate 2, fig. 6).

Females: Length 3.6 to 4.4 mm., width 1.5 to 1.8 mm. Last segment of abdomen flat, rounded, margined with oblique basal pits usually obscured by vestiture.

Pandeleiteius cinereus ranges throughout Texas except the panhandle, and a few specimens were seen from Norman, Oklahoma, and Nuevo Leon, Mexico. Fifty-three specimens were examined.

Pierce (1916, p. 7) states that "*Pandeleiteius cinereus* Horn breeds in the stems of mistletoe (*Phoradendron flavescens*) in Texas. The adults mature in the spring. The entire development takes place in the larval cell." Specimens in collections bore out these findings. All were collected in April through June. There were records of *P. cinereus* on juniper "causing death to ends of branches" and "bred from *Phoradendron flavescens* stems." The most common host label was oak, but occasional specimens were collected on *Juniperus*, *Bumelia lanuginosa*, walnut, pecan, elm, and mesquite.

Pandeleiteius cinereus is easily distinguished by its reticulate scales, characteristic beak, alternately raised elytral intervals, short swollen elytra, and two oblique bicolored fasciae of elytra.

Pandeleiteius subtropicus Fall.

(Plate 2, fig. 4.)

Pandeleitejus subtropicus FALL, 1907, p. 263.

Scales cupreous with large areas of white and some dark brown scales. Thorax with very broad median white or light vitta which extends over vertex; elytra with broad white vitta about scutellum and oblique white fascia about middle of elytra coalescing with the white epipleura. Under-surface white.

Scales with broad raised margins and raised lines presenting a reticulate appearance. Setae of dorsal surface declinate, of moderate size, but inconspicuously colored.

Beak flattened, with median line impressed from between eyes to about middle, sometimes extending well back on frons. Midline carinate from middle to apex, the carina extending around the apical emargination of beak which is obtusely triangular to arcuate. Dorsal surface of beak with an arcuate keel on each side which extends from apex of scrobes nearly to origin of median carina. Anterior margin of epistoma truncate with tip of beak, median emargination varying from a slight asymmetrical indentation to a strong triangular emargination. Scrobes horizontal, then sharply descending to underside of beak. Eyes small, prominent. Head transversely

flattened between eyes, prominent behind eyes. Antennal club with first segment elongated, tip oval.

Thorax usually longer than broad, but occasionally as broad as long because of the shortened apical projection. Apical and basal constrictions moderate laterally, weak dorsally. Dorsal surface of thorax slightly irregular, with shallow elongate depressions on each side below middle. Punctures obscure, setate. Anterior margin of thorax unusual in that it lacks any trace of ocular lobes, teeth, or fimbriae.

Elytra usually 2.2 to 2.5 times length of thorax in male, usually more than 2.5 times length of thorax in female. Humeri prominent. Elytra with sides gently divergent to about middle, thence gently convergent to apex. Declivity gently arcuate to oblique. Alternate intervals more convex, often interrupted, especially about declivity. Strial punctures moderate.

Legs short, fore femora scarcely enlarged. Fore tibiae straight, only very slightly bent at apex, inner edge of each with five to nine acute teeth.

Males: Length 2.9 to 3.3 mm., width 1.2 to 1.4 mm. Last abdominal segment gently convex, apex slightly emarginate. Aedeagus very small for *Pandeleiteius*, slender (plate 2, fig. 4).

Females: Length 3.3 to 4.0 mm., width 1.4 to 1.8 mm. Last abdominal segment flat with shallow depression each side of middle at base. Elytra only slightly broader than in male. The secondary sexual characters are weakly expressed in this species.

No lectotype was designated for this species, since it is uncertain from Fall's paper just how many cotypes are in existence. Three cotypes are in the California Academy of Sciences, although the Fall collection is in the Museum of Comparative Zoology. *Pandeleiteius subtropicus* is such a distinctive species that a lectotype should not be vital in the immediate future.

Only 30 specimens of *P. subtropicus* were seen, 21 from the Florida keys, 7 from Dade County, Florida, and 2 from Santa Rosa, Lower California. There appeared to be no differences in the beetles from these two widely separated localities.

Pandeleiteius subtropicus is very closely related to *P. cinereus* in its small size, strongly margined scales, truncate epistoma, and secondary sexual characteristics, yet it is easy to separate from *P. cinereus* by its more reticulate and cupreous scales and more elaborately sculptured beak, thorax, and elytra.

Like *P. cinereus*, *P. subtropicus* resembles *Pandeleiteinus* in many aspects; e.g., small size, small prominent eyes, weak thoracic constrictions, only slightly enlarged fore legs, weak secondary sexual characters. However, the primary characters are those of *Pandeleiteius*.

The absence of ocular vibrissae and atypical aedeagus (shorter, more

slender) may eventually cause the removal of *P. subtropicus* from *Pandeleiteius*.

Pandeleiteius buchanani Howden, new species.

(Plate 2, fig. 14.)

HOLOTYPE: *Male*, length 3.8 mm., width 1.4 mm.

Color ferrugineous, covered with white, light brown, and piceous scales. Head light with indistinct dark median line on vertex and a white patch above each eye. Thorax broadly dark medially with sides pale. Elytra with a conspicuous, slightly oblique, broad, black band from middle to apical third irregularly bordered on both sides with white scales, another narrow black band across declivity. Fifth, sixth, and seventh intervals white on apical fourth, the white scales contiguous with those bordering apical band; remainder of disc of elytra with scattered white patches. Undersurface white, legs mottled.

Scales roughly sculptured with raised margins and granulations or reticulations, like the scales of *P. cinereus*.

Head and beak with sides convergent from base to apex. Dorsum of beak narrow from eyes to apex so that scrobes and genae are broadly visible from above. Moderately impressed median line extends from between middle of eyes to apex. Beak nearly flat on each side of median line; sides of disc rounded, slightly elevated over insertion of antennae; apex of beak deflected; surface deeply but finely setate punctate. Apex of beak obtusely triangularly emarginate. Scales of beak ending in a straight line across tip of beak and therefore not reaching extreme anterior at sides. Anterior margin of epistoma broadly arcuate, only slightly produced beyond sides of beak. Epistoma indistinctly raised medially, similar to median ridge in epistoma of *P. hilaris*. Scrobes directed diagonally toward upper part of eye, nearly reaching eye, then sharply descending almost vertically nearly to underside of beak, passing very close to eye. Eyes elliptical, not prominent; when beak is viewed dorsally, eyes scarcely extend beyond sides of head.

Thorax subcylindrical. Basal and apical constrictions present, sides of thorax only slightly arcuate between them. Apical constriction slightly before apical third of thorax medially. Constrictions in lateral profile not at all prominent. Thoracic punctures small, moderately deep, not at all conspicuous, each with a seta at posterior edge directed toward middle of apex of thorax; a short median line impunctate. Setae long, recurved, and of moderate width; longer and of same width as setae of *P. hilaris*.

Elytra approximately 2.1 times length of thorax; elytra measured across humeri approximately 1.3 times width of thorax. Elytra with sides parallel to beyond apical third, thence slightly convergent to declivity, thence

strongly rounded to apex. Humeri moderately prominent, anteriorly slightly oblique. Elytra quite convex transversely; scarcely convex longitudinally; not flattened or depressed behind humeri; declivity strong. Strial punctures deep but not large. Intervals narrow, convex, each with a row of decurved setae directed posteriorly.

Fore legs only slightly enlarged. Fore femora bowed. Fore tibiae straight, of even thickness from base to apical sixth where they are slightly thinner, thence gently flared outward and obtusely bent inward. Inner edge of each fore tibia with seven piceous sharp teeth. Hind femora as long as fore femora but not quite as thick, especially basally. Hind tibiae on outer surface similar to other tibiae but broader and flatter; inner surface with conspicuous spatulate modification as follows: surface rufous, shiny, obliquely flattened, without scales on apical half, but with stout, erect, blunt, piceous, and fuscous setae on basal three-fourths and along outer margin to corbel. Inner margin of hind tibiae with short, pale, decumbent setae as on inner margin of intermediate tibiae.

Fore and middle coxae narrowly separated, equidistant. Posterior margin of first abdominal segment straight. Last abdominal segment slightly convex, especially apically, lacking margin at apex, not noticeably truncate or emarginate at apex.

Aedeagus (plate 2, fig. 14) short, surface smooth and shiny, rufous. Apical opening elliptical in outline. Ventral surface flat, curved downward from basal third, thickest at opening.

ALLOTYPE: *Female*, length 4.5 mm., width 1.8 mm.

Color pattern as in holotype, except that all but the piceous band is obscured by "salt and pepper" markings formed by single dark and light scales intermingled. A few scales with a small median pustule and a few completely opaque scales on head and beak. Head and beak more robust than in holotype. Median line only slightly impressed from between eyes to between insertion of antennae where there is a shallow elongate concavity. Anterior margin of epistoma irregularly arcuate, obtusely pointed medially.

Thorax broader than in holotype, but still decidedly longer than broad; sides of elytra subparallel, slightly broader just behind middle. Elytra more convex along both axes.

Inner edge of each fore tibia with six fuscous teeth. Hind tibiae with a flattened shiny glabrous area on upper edge of distal third, otherwise similar to middle tibiae.

Fore and middle coxae equidistant but more widely separated than in holotype. Posterior margin of first abdominal segment very shallowly emarginate medially. Last abdominal segment longitudinally tumescent, with

oblique basal pits deep, and margin broadly flattened from base to middle of sides.

Holotype, male, Montezuma Pass Headquarters, Huachuca Mountains, Arizona, July 6, 1956, H. & A. Howden (CAS). Allotype, female, Montezuma Pass, Huachuca Mountains, Arizona, July 6, 1956, oak, H. & A. Howden (CAS). Paratypes: 58 males, 99 females, as follows: *ARIZONA*: 8 females, same data as type; 2 females, same data as allotype; 2 males, Cornell University lot 822, sub 22; 1 male, C. V. Riley Collection; 2 males, 2 females, S. W. Research Station, Portal, July 4, 1956, H. & A. Howden, oak (2), pine (2); 1 female, S. W. Research Station, Portal, July 8, 1956, H. & A. Howden, light; 2 males, 3 females, Chiricahua Mts., July 20, 1949, on oak stem, Lindsay & Kaiser, 49-15417; 1 male, 1 female, Chiricahua Mts., July 27, 29, 1953, D. J. & J. N. Knull; 1 male, Sun glow, May 15, 1946, A. W. Ford, in E. L. Sleeper Collection; 1 female, Sun glow, July 15, 1942, H. V. West, in E. L. Sleeper Collection; 1 female, Sunnyside, July 20, 1942, H. V. West, in E. L. Sleeper Collection; 1 female, Sunnyside, September 1, 1942, H. V. West, in E. L. Sleeper Collection; 1 female, Carr Canyon, Huachuca Mts., September 28, 1956, L. J. Bottimer, on oak; 3 males, 4 females, Huachuca Mts., Brooklyn Museum Collection, 1929; 2 males, 1 female, Huachuca Mts., July, 1905, ac. 5152; 1 female, Canelo, August 3, 1956, G. D. Butler; 2 females, Miller Canyon, Huachuca Mts., July 11, 25, 1907, H. A. Kaeber; 1 male, 2 females, Huachuca Mts., August 7, 10, 1953, D. J. & J. N. Knull; 5 males, 10 females, Ft. Huachuca, August 3, 1924, J. O. Martin & E. P. Van Duzee; 2 males, 8 females, Carr Canyon, Huachuca Mts., July 7, 1930, J. O. Martin; 1 male, 4 females, Huachuca Mts., Carr Canyon, August 5, 6, 1924, J. O. Martin; 1 female, Carr Canyon, Huachuca Mts., Aug. 7, 1952, Leech & Green; 5 females, Huachuca Mts., Cochise County, Floor of Carr Canyon, 5400 ft., August 8-9, 1952, H. B. Leech & J. W. Green; 1 male, 1 female, Ramsey Canyon, Huachuca Mts., July 15-19, 1912, J. R. Slevin; 1 female, Nogales, Santa Cruz County, August 31, 1906, F. W. Nunenmacher; 2 females, Nogales, September, 1906, A. Koebele, in Koebele Collection; 1 male, Kits Peak Rincon, Baboquivari Mts., 1-4, August, 1916, 30° 57' N., 111° 33' W., about 4050 ft.; 1 female, Tubac, July 15, 1945, A. W. Ford, in E. L. Sleeper Collection; 4 males, 7 females, Florida Canyon, Santa Rita Mts., August 10, 1924, E. P. Van Duzee; 1 female, Santa Rita Mts., September 26, 1925, A. A. Nichol, in A. Nicolay Collection; 2 males, 1 female, Madera Canyon, Santa Rita Mts., Pima County, August 20, 1955, F. G. Werner & G. D. Butler; 8 males, 11 females, Madera Canyon, Santa Rita Mts., Pima County, August 7, 1957; 2 males, 1 female, Santa Rita, R. R., August 7, 8, 1957, C. O'Brien; 2 males, 1 female, Mt. Lemon Control Station, Santa Catalina Mts., July 26, 1924, E. P. Van Duzee; 1 male, 1 female, Pepper Sauce Canyon, Santa Catalina Mts., August 16, 1924, E. P. Van Duzee;

2 females, Sabino Basin, Santa Catalina Mts., 32° 22' N., 110° 46.5' W., about 3800 ft., July 8–20, 1916; 1 female, 14 mi. E. Oracle, July 27, 1924, E. P. Van Duzee; 7 males, 5 females, Oracle, July 5, 6, 7, 9, 11, 13, 16, Hubbard & Schwarz; 1 female, near Oracle, August 17, 1940, Van Dyke; 5 males, 5 females, Palmerlee, July 4, 7, 8, 9, 10, 25, 1907, H. A. Kaerber; 1 male, 1 female, Fort Grant, July 13, Hubbard & Schwarz; 2 females, Cochise Stronghold, Cochise County, July 29, 1957, C. W. O'Brien. *NEW MEXICO*: 1 male, 3 females, Double Adobe Ranch, Animas Mts., 5500 ft., Hidalgo County, August 15, 1952, H. B. Leech & J. W. Green.

Paratypes are in the following collections: AMNH, CAS, CNC, CU, INHS, OSU, USNM, UA, Bottimer, Frost, Howden, Sleeper.

Male paratypes vary in length from 3.2 to 4.1 mm., and in width from 1.3 to 1.6 mm. Female paratypes vary in length from 3.7 to 5.2 mm., and in width from 1.5 to 2.2 mm. The holotype and allotype are of average size.

The color pattern is quite constant and distinctive in this species, although the disc of the elytra and the thorax sometimes have scattered single white scales or small patches of scales which produce a "salt and pepper" effect. The regular markings are: white sides of the thorax; epipleura broadly white extending over the humeri to fifth interval, extending again in a broad slightly oblique fascia at middle, and again in a broad fascia over summit of declivity; elytra piceous between the two white fasciae. This piceous area is rarely interrupted by pale scales and is quite a conspicuous feature. Very few specimens of this species were so greasy or teneral or abraded that they could not be at least tentatively diagnosed macroscopically as *P. buchmanii* on the basis of the elytral marking alone. Accessory white markings on thorax are frequent and quite varied; they often form a cross near base.

Scales are always as described for holotype and allotype. The beak varies among the paratypes in the median impressed line and amount of deflection at apex. The median line is sometimes very vaguely impressed throughout, sometimes deep throughout; in either case, with or without the obsolescent shallow depression at its apex. The amount of tumescence over the scrobes varies, sometimes absent, never strong; when the tumescence is present, the beak appears more strongly deflected at the apex. The setae are of various colors, regardless of the color of the scales beneath them, but are most often pale.

The anterior margin of the epistoma is quite variable in shape, but always extends about the same distance over the mandibles. The anterior margin varies from very obtusely triangular, to bisinuate, to arcuate, with or without the obsolete median ridge extending in a short median point. The scrobe is always very much like that of the holotype and allotype. The head and beak are more robust in females than in males, but never as robust as in

many females of *P. simplarius*; when viewed anteriorly the eyes always reach or extend beyond the sides of the head.

The thorax is always decidedly longer than broad, usually subcylindrical, the constrictions never deep dorsally. The thorax sometimes has the sides rather arcuate, but always definitely narrower at broadest point than elytra across humeri.

The sides of the elytra are always subparallel, never very strikingly broader behind the middle in females as in many species. The elytra are always markedly convex along the transverse axis, of varying convexity along the longitudinal axis, but always the convexity begins at the extreme base. Elytral striae and intervals are quite constant. The declivity varies somewhat in angle from not quite vertical to oblique.

Each fore tibia has from five to ten sharp teeth on the inner edge. The hind tibiae of the males always have the large conspicuous flattened area, the only variation seen being in the number of suberect blunt setae on the surface; in some specimens they were scattered over the entire area, in others they were only at the base. These setae are probably easily abraded.

The posterior margin of the first abdominal segment is usually nearly straight in males but is sometimes indented as much as in many females; the margin is never very strongly emarginate even in females. The last abdominal segment in paratypes of both sexes is like that of the type and allotype, although the degree of tumescence varies slightly and in some specimens of both sexes the apex appears slightly truncate.

Pandeleiteius buchanani is a quite distinct species related by some important characters to *P. cinereus* and by other characters to *P. simplarius*, yet different from both in other respects. In the collections examined, specimens of *P. buchanani* were often among series of both *P. cinereus* and *P. simplarius*; it is related to both. It is related to *P. cinereus* by almost identical scales, setae, scrobes, short straight fore tibiae, similar color pattern, and size; it is related to *P. simplarius* by its very similar beak and epistoma and all secondary sexual characters. It is separated from both species by its more western distribution, the closest locality for the two species being *P. buchanani* from the Animas Mountains of extreme southwestern New Mexico and *P. simplarius* from Clouderoft in south-central New Mexico.

Pandeleiteius buchanani can be readily separated from all other known species of *Pandeleiteius* by the following combination of characters: broad subapical piceous band on elytra broadly bordered anteriorly and posteriorly with white; scales margined, granular to reticulate; dorsal surface of beak narrowed anteriorly, pregenae and scrobes broadly visible from above; epistoma moderately arcuately produced beyond sides of beak; scrobes angular, passing close to eyes and nearly reaching ventral surface of beak; thorax markedly longer than broad; elytra with sides subparallel, strongly convex

transversely; declivity strong; intervals narrow, convex; hind tibiae of males spatulate, hind tibiae of females flattened apically; aedeagus short, straight, thickest at apical opening.

This species appears limited to a small area in southeastern Arizona from the Baboquivari Mountains north to Oracle, east to Ft. Grant and southeast to the Animas Mountains of New Mexico. From specimens examined and personal observation, it is common at the lower elevations in the mountains in this area in July, August, and September. It was collected on oak principally, but specimens were also taken on pine and at light at night.

This species is named in honor of L. L. Buchanan, a well known worker on weevils, who very graciously gave the author his extensive notes on *Pandeleteiini*.

***Pandeleteius simplarius* Fall.**

(Plate 2, fig. 11.)

Pandeletejus simplarius FALL, 1907, p. 263.

Pandeleteius spatulatus GREEN, 1920, pp. 195-196. *New synonymy*.

Color usually predominantly light gray (light brown in teneral specimens) covered with oyster white scales and marked with dark and light brown scales. Dark scales sometimes so numerous as to give a "salt and pepper" appearance and obscure the color pattern. Markings consist of a median fusiform dark brown vitta on thorax, a stout white oblique fascia about the middle of elytra, and a broad arcuate fascia on vertical surface of declivity.

Scales alutaceous to lightly granular, not margined, without central tubercle, rounded in outline, and usually not quite contiguous. Setae of dorsal surface decumbent, fine, small and inconspicuous.

Beak short, stout, narrowed anteriorly, slightly convex either side of impressed median line which extends from base to apical third. Apex of beak slightly deflected, obtusely triangularly emarginate. Anterior margin of epistoma roughly truncate, asymmetrically indented. Pregenae broadly visible below scrobes when viewed dorsally; genae more robust in females. Scrobes gently arcuate, widened behind, directed toward lower margin of eyes, but not reaching them. Eyes oval, flattened in female, slightly convex in male. Antennal club stout, pointed oval.

Thorax subspherical or ovoid, about as broad as long, sides gently arcuate. Apical constriction absent dorsally, sometimes present laterally; basal constriction adjacent to base. Thorax deeply, closely, setate-punctate on disc, becoming impunctate cephalad of apical constriction.

Elytra usually twice as long as thorax in females, less than twice as

long as thorax in males. Elytra strongly convex longitudinally and transversely; humeri not prominent. Elytra across humeri only slightly wider than thorax, broadest at middle. Strial punctures elongate to rounded, shallow to moderately deep. Intervals slightly to moderately convex.

Fore legs greatly enlarged. Fore tibiae slightly sinuate, bent inward at apex; inner edge with seven to ten teeth, the middle teeth larger than those at either end.

Fore coxae broadly separated, slightly more widely separated in female than in male.

Males: Length 3.6 to 4.8 mm., width 1.5 to 1.8 mm. Last segment of abdomen broadly, gently convex, apex deflected and truncate. Last dorsal segment transversely swollen, with numerous short light hairs, apical margin sharply emarginate. Hind tibiae "spatulate," i.e., gradually widened apically, inner surface strongly concave, distal half of concavity without scales but with yellow hairs. Outer surface of hind tibiae near normal, but much broader than other tibiae. Aedeagus (plate 2, fig. 11) with apical opening extending one-third of the way to the base.

Females: Length 4.2 to 6.4 mm., width 1.7 to 2.4 mm. Last segment of abdomen tumid from apex to center. Hind tibiae with inner surface near apex flattened, without scales, and with numerous dark bristle-like setae.

Dr. E. A. Chapin graciously compared some topotypes with Fall's unique type of *Pandeteleius simplarius* in the Museum of Comparative Zoology. Fall's type is a female and hence has the unmodified hind tibiae. The female homotype of *P. simplarius* and eight female paratypes of *P. spatulatus* Green were compared by the author and are unquestionably the same species.

Eight specimens were seen from the *P. simplarius* type locality of Cloudercroft, New Mexico; the other 93 specimens examined were all from the *P. spatulatus* type locality of the Chisos Mountains, Texas. Except for the color which is more brown than gray in some of the Cloudercroft specimens, there are no differences between them and the Texas specimens.

Pandeteleius simplarius is easily distinguished from other species by its distinctive habitus, truncate epistoma, short areolate scrobe, and secondary sexual characters. It bears the maximum expression of secondary sexual characters of United States species.

Specimens were collected in June and July; a few bear the host label of locust.

***Pandeteleius robustus* Schaeffer.**

(Plate 1, fig. 4, plate 2, fig. 5.)

Pandeteleius robustus SCHAEFFER, 1908, p. 215. Lectotype male here designated.

There are seven cotypes of *Pandeteleius robustus* Schaeffer in the United States National Museum collection. Only one of these has the thorax as

long as wide as stated in Schaeffer's description. This specimen, a male, labelled, "Huach. Mts., Ariz.," "Brooklyn Museum Coll. 1929," "Cotype No. 42475 U.S.N.M.," is here designated as lectotype and has been so labelled. The specimen selected as allotype is labelled "Palmerlee Cochise Co., VII, Ariz.," "Brooklyn Museum Coll. 1929," "Cotype No. 42475 U.S.N.M." It has the elytra "gradually widening towards apex" which is characteristic of the females and is therefore not apparent in the lectotype.

LECTOTYPE: *Male*, length 5.0 mm., width 1.8 mm.

Color light ferrugineous covered with near-white, testaceous, and fuscous scales. Head and beak mostly testaceous. Thorax testaceous and white with two fuscous vittae which form a diamond on the convexity. Elytra with suture testaceous; small fuscous dot on base of third interval; apical third of elytra including declivity mostly white, bordered anteriorly with fuscous fascia.

Scales not contiguous, finely margined. Scales of the disc of the thorax with central pustule and coarse granules; the granules becoming less distinct and the pustules becoming larger toward apex of thorax until along the anterior margin, the scales are entirely smooth, shiny, and convex. The latter condition prevails on the head and beak. Scales of the disc of the elytra with or without small central pustule and distinct coarse granules. Undersurface with rounded, finely sculptured, slightly opalescent scales which are not contiguous. Setae of dorsal surface moderately long, slender, nearly decumbent, inconspicuous. Undersurface and inner edges of legs with very long, slender, white hairs.

Beak (plate 1, fig. 4) thick, rather long, flattened. Dorsal surface gently narrowed anteriorly. Scrobes and pregenae broadly visible from above. Median line deeply impressed from between eyes to between insertion of antennae. Apex of beak slightly deflected either side of midline, emargination obtusely triangular, marked with a slight keel. Anterior margin of epistoma slightly arcuate. Scrobes short, slightly arcuate, directed toward lower margin of eyes, not clearly defined posteriorly. Eyes large, elliptical (Schaeffer described them as "rounded"), slightly convex, nearly touching dorsal surface of beak, and extending beyond sides of head when viewed dorsally. Antennae with funicular segments long and slender, first segment 1.5 times as long as second; club elongate.

Thorax (plate 1, fig. 4) nearly as long as broad, with strong basal and apical constrictions, subspherical between constrictions. Ocular vibrissae arising from large blunt tooth. Sides of thorax swollen about insertion of coxae, the swelling narrowly visible from above; sides of thorax in dorsal profile nearly straight. Thoracic punctures subfoveate, sparse, becoming

much shallower on basal half at sides. Short, irregular median line impressed on basal half of disc above basal constriction.

Elytra about two times length of thorax; elytra across humeri approximately 1.1 times width of thorax; humeri prominent. Third interval tumid at base, sutural intervals elevated at crest of declivity, and fifth interval tumid at its termination. Sides of elytra subparallel, indistinctly swollen behind humeri. Striae of moderate-sized deep punctures; intervals nearly flat with a row of setae, the latter slightly more numerous on the alternate intervals which are also very slightly more convex. Declivity rather abrupt but oblique.

Fore legs greatly enlarged. Fore tibiae slender, longer than fore femora; middle and hind tibiae shorter than their associated femora. Fore tibiae curved inward at apical third, inner edge of each with six irregular small teeth interspersed with numerous denticles. Hind and, to a lesser extent, middle tibiae with their inner surfaces near apex flattened, without scales, but with long hairs and very shiny; inner edge of tibiae denticulate.

Fore and middle coxae widely separated; fore coxae slightly more widely separated than middle coxae. Posterior margin of first abdominal segment almost straight, scarcely emarginate medially. Last abdominal segment slightly convex, apex broadly, areately emarginate.

ALLOTYPE: *Female*, length 6.2 mm., width 2.5 mm.

Colored as lectotype male but with elytral markings more distinct. Beak more robust than in lectotype, pregenae and scrobes more broadly visible from above. Eyes flattened, not reaching sides of head when viewed from above. Thorax distinctly broader than long. Elytra 2.4 times length of thorax; elytra across humeri approximately 1.1 times the width of thorax as in lectotype male. Elytra distinctly swollen beyond basal fourth. Alternate intervals more obviously convex, especially at declivity. Fifth interval much more tumid at its termination. Extreme apex of elytra slightly produced, giving profile of declivity a slight sinuosity. Fore tibiae each with eight small teeth on inner edge. Flattened area on hind and middle tibiae smaller. Fore coxae separated by twice the distance of the middle coxae. Posterior margin of the first abdominal segment slightly areately emarginate medially. Last abdominal segment nearly flat with foveate depression on each side at base; margin complete; apex broadly rounded. A fine groove extending around this segment parallel to margin.

VARIATION: Length of males examined varies from 4.3 to 5.8 mm., width from 1.7 to 2.3 mm. Length of females varies from 5.0 to 7.4 mm., width from 2.0 to 3.2 mm. Elytra are often so mottled that the color pattern is obscured, but the thoracic vittae are rather constant. The suture is always testaceous and there are often two or three short indistinct spurs extending

from it; the declivity is usually marbled with white. The anterior margin of the epistoma varies from arcuate to rounded, often irregular. The median line of the thorax varies from obsolete to quite pronounced on the basal two-thirds. The elytra are 1.9 to 2.5 times the length of the thorax, longest in females. The third and fifth intervals are usually slightly more convex. At the base of the fifth interval are often found one to three inconspicuous sub-erect white setae which would not be notable except that they appear to be a rudimentary expression of the tuft of setae in *P. plumosiventris*. Fore tibiae each with 6 to 11 irregular small teeth. The flattened area at the apex of each hind tibia is a bisexual characteristic but is usually much weaker in females than in males.

The aedeagus (plate 2, fig. 5) is very large, only slightly arcuate—twice the size of the aedeagus of the majority of species of *Pandeleiteius*. The long thin apical projection is curved downward, parallel-sided, and truncate at apex.

In the male the second segment of the abdomen medially is as long as the third and fourth segments combined. The last abdominal segment sometimes has the apex slightly deflected and is rather evenly convex or flat.

In the female the second segment of the abdomen medially is one-half to three-fourths longer than segments three and four combined. The last abdominal segment is slightly truncate to broadly rounded at apex.

Over 200 specimens of *P. robustus* were seen from the Chiricahua, Huachuca, and Santa Rita mountains of Arizona where it was collected in July, August, and October on *Quercus arizonensis* and Douglas fir. In addition, many specimens from Mexico were examined which probably belonged to *P. robustus*. Both the Mexican and Arizona specimens were more common, but not restricted, to the higher altitudes, i.e., around 7000 to 8000 ft. Mexican specimens need further study in relationship to *P. hirtipes* Champion and *P. maculicollis* Champion.

Pandeleiteius robustus is distinguished from other United States species by its large size, robust form, thorax subspherical between strong basal and apical constrictions, and hind and middle tibiae slightly modified in both sexes. The tooth at the anterior margin of the thorax is much larger than in the other species of *Pandeleiteius* except *P. henryi*, new species, to which it is also closely related in several other respects (see discussion following description of *P. henryi*).

***Pandeleiteius henryi* Howden, new species.**

(Plate 1, fig. 1, plate 2, fig. 8.)

HOLATYPE: *Male*, length 5.5 mm., width 2.0 mm.

Color fuscous; tibiae, tarsi, and antennae (except darker club) ferruginous. Clothed with white, light testaceous, and piceous scales. Head and

beak predominantly testaceous. Disc of thorax testaceous, mottled with white on sides. Elytra mottled, sutural interval mostly testaceous; fifth, sixth, and seventh intervals mostly white from base to middle; piceous diagonal fascia below middle, bordered posteriorly by a broad white fascia, both fasciae reaching suture. Legs mottled, mostly white; undersurface white.

Scales of elytra granular, without margins, not contiguous, a few with a small central smooth shiny spot. Scales of base and sides of thorax like those of elytra; the shiny central pustule on the scales becoming larger toward middle and anterior of thorax, until on the impunctate median elevation and in a broad band along anterior margin of thorax, the scales are largely convex, smooth, and shiny. Scales of head and beak grading from granular with pustules on vertex to convex, unsculptured, and shiny on beak.

Beak (plate 1, fig. 1) very stout, short, cubical, nearly flat, scarcely inclined from occiput to apex. A few scattered small setate punctures on head; setae of beak more numerous, long, slender, and decumbent. Serobes not visible from above, pregenae only narrowly visible from above. Beak marked with an obsolete median impressed line between eyes and a shallow circular depression at crest of deflection. Apex of beak abruptly, vertically deflected at apex of serobes. Emargination at apex of beak acutely triangular, vertical. Base of epistoma vertical; apical half of epistoma horizontal, extending only a short distance. Anterior margin of epistoma very irregular, probably from abrasion. Mandibles closed, nearly concealed from above by epistoma. Labrum and maxillae completely exposed, the tips of the maxillae visible from above. Serobes very short, nearly horizontal, dorsal margin arcuate, not quite reaching lower margin of eye, deep throughout. Funicle seven-segmented; first segment of funicle almost half as long as scape, second segment two-thirds the length of first segment, other segments subequal, moniliform. Eyes large, oval, slightly convex, but not prominent, reaching but not extending beyond sides of head when viewed from above.

Thorax slightly longer than broad, sides arcuate, broadest behind middle. Apical constriction absent dorsally, apparent on sides at apical fourth; basal constriction complete, very close to basal margin. Dorsal surface of thorax (plate 1, fig. 1) gently arcuate in later profile. Short impunctate median elevation with scales as described above. Thoracic punctures of moderate size and foveate along base and on either side of midline, becoming shallower and more distant apically and laterally. Seta at the base of each puncture long, slender, recurved, but nearly prostrate. Ocular vibrissae arising from a relatively large, blunt tooth.

Elytra slightly less than twice as long as thorax; humeri prominent. Sides subparallel, widest at middle. Declivity slightly evident in dorsal

outline. Third interval with basal fifth obsoletely raised. Elytra in lateral profile slender, flat dorsally, slightly inclined from middle to declivity. Declivity at apical ninth, oblique, arcuate at crest. Fifth interval not prominent at its termination. Elytral intervals even, slightly convex, each with an irregular row of setae which are slightly longer and more lanceolate than those of the thorax. Striae with small deep punctures which are separated by a distance of more than their own diameter. Scutellum large.

Fore legs enlarged; fore femora stout, slightly bowed. Fore tibiae of equal thickness throughout, curved inward at apical third. Inner edge of each fore tibia with nine uneven teeth, irregularly distributed, apical curved edge serrate, entire edge with numerous long erect hairs which do not obscure teeth. Apical tooth of fore tibiae slightly larger than the median teeth; apex of each fore tibia with only six very small bristles across apex near apical tooth. Middle legs short; inner edges of middle tibiae without scales, with numerous long, fine hairs and three denticles. Inner edges of hind tibiae denticulate; inner surfaces slightly flattened apically, without scales and with numerous long, fine hairs. Hind tibiae in anterior profile only slightly thinner near apex, not extremely spatulate as in *P. buchanani* and *P. simplarius*, but intermediate between the spatulate and normal tibiae.

Fore coxae separated by about the same distance as the middle coxae. Posterior margin of first abdominal segment obsoletely emarginate medially. Last abdominal segment slightly convex, broadly truncate with apical margin slightly indented.

Aedeagus as in plate 2, fig. 8.

ALLOTYPE: *Female*, length 6.9 mm., width 3.1 mm.

Color as in type, but markings of elytra somewhat more obscured; vertex broadly white each side of middle. Scales like those of type.

Beak with median line lightly impressed from between eyes to apex. Beak not more robust than in type. Extended sides of epistoma slightly convergent, anterior margin truncate, vaguely sinuate. Epistoma extending slightly beyond mandibles which are closed and extend only a short distance beyond apex of beak. Labrum and maxillae fully exposed as in type.

Elytra swollen dorsally and laterally behind humeri, widest at middle. Elytra more than twice as long as thorax.

Fore legs similar to those of holotype. Hind tibiae each with a flattened, hairy area at apex like that of male holotype and as large as in the holotype. Fore coxae separated by a slightly wider distance than middle coxae; both coxae much more widely separated than those of male holotype. Posterior margin of first abdominal segment only slightly more emarginate than in male holotype. First and second abdominal segments longer than in male. Last abdominal segment more elongate than in male, much more strongly convex and narrowly truncate apically.

Holotype, male, Madera Canyon, Santa Rita Mts., Arizona, October 18, 1936, E. P. Van Duzee (CAS). Allotype, female, same data as holotype (CAS). Paratypes, 1 male, 6 females, as follows: ARIZONA: 1 male, 3 females, same data as holotype; 1 female, Madera Canyon, Santa Rita Mts., Pima County, September 26, 1956, C. W. O'Brien; 2 females, Southwest Research Station, Chiricahua Mts., September 26, September 28, 1956, A. M. Nadler.

Paratypes are in the following collections: CAS, UA, Bottimer, Howden.

The type series of *P. henryi* are remarkably uniform. The type and allotype represent the extremes in size. The beak in some of the paratypes appears to be slightly more tumescent over the scrobes than in the type. Sexual differences include the swollen and slightly longer elytra of the female; the longer first, second and last abdominal segments of the female, and the different contours of the last abdominal segment; but not the modified hind tibiae which are alike in both sexes.

Pandeleteius henryi may be distinguished from other *Pandeleteius* by its cubical beak which is scarcely inclined from the head, very short scrobes and slightly modified hind tibiae in both sexes. *Pandeleteius henryi* is most closely related to *P. robustus* in its large size, similar forelegs, similar scrobes, and large tooth from which the ocular vibrissae arise; however, its thorax resembles that of *P. simplarius* more than *P. robustus*, and its secondary sexual characters fall between the two species. It is also related to *P. plumosiventris* (of which only females are known) in the features of the scrobes, beak, hind tibiae, last abdominal segment, and shape of elytra.

With considerable pleasure I name this striking species for my husband.

Pandeleteius plumosiventris Howden, new species.

(Plate 1, fig. 2 and 3.)

HOLOTYPE: *Female*, length 4.2 mm., width 1.7 mm.

Color brown with legs and antennae light ferrugineous, covered with cinereous and pale brown scales. Thorax with narrow dark parenthesis-shaped vittae, white in center. Elytra slightly mottled, each with an indistinct, dark, diagonal fascia on apical third (visible macroscopically only), and a white spot at the base of the fifth interval.

Scales conspicuously margined with vague central pustule and irregular lines and large granules presenting a mosaic surface. Scales mostly not contiguous.

Beak (plate 1, figs. 2 and 3) short, dorsal surface narrow with sides parallel; pregenae and scrobes narrowly visible from above. Median line impressed from between eyes to between insertion of antennae, thence gradually becoming carinate to apex. Beak flat between eyes becoming slightly

inclined toward median line over scrobes, apex declined. Head and beak set with long recurved setae, those of vertex nearly decumbent and inconspicuous; declined apex of beak with scattered long slender white hairs. Apical emargination very obtusely, shallowly triangular, carinate, with conspicuous yellow hairs along carina. Epistoma (plate 1, fig. 3) broad at base, apical margin rounded, extending a short distance beyond sides of beak. Scrobes very short, slightly arcuate, much broader behind, bordered ventrally with plumose scale-like setae which extend in a band to ventral surface of beak. Eyes oval, flattened, extending slightly beyond sides of head in anterior view. Funicle seven-segmented, second segment one-half the length of the first, outer segments becoming moniliform. Antennal club moderate in length, pointed oval.

Thorax longer than broad, sides gently arcuate, constrictions moderate, apical constriction at apical third medially. Surface with sparse punctures, deep on disc, much shallower toward sides. Short impunctate median line slightly elevated. A long, rather stout recurved seta at the posterior margin of each puncture, setae more numerous on the apical constriction where there are no punctures. A row of plumose hairs on posterior edge of prothorax and anterior edge of elytra.

Elytra 2.2 times length of thorax; elytra across humeri approximately 1.3 times the width of the thorax. Humeri prominent; elytra slightly swollen behind basal fourth, broadest medially. Deelvity only slightly indicated in dorsal outline, gently arcuate in lateral outline. Alternate intervals (one, three, five, seven) convex with a thick row of thick recurved setae. Setae of extreme apex somewhat straightened. Intervals two, four, and six flat; interval two with one to two setae, interval four with four setae, interval six with 11 setae. Striae of small, deep punctures separated by twice their diameter, each bearing a minute seta. A cluster of four thick, white, long, erect setae at the base of the fifth interval.

Fore legs moderately enlarged. Fore femora slightly bowed. Fore tibiae of equal thickness throughout, bent inward from apical third. Inner edge of each fore tibia with seven rather acute teeth, between each tooth one or two small serrations and a few long slender hairs which do not obscure teeth. Inner edge of middle and hind tibiae at apex each with a small, smooth, shiny, glabrous area, which may be an indication of a similar but larger modification or even spatulate tibiae in the male. Entire undersurface, coxae, and inner edge of legs with sparse, long, fine white hairs.

Fore coxae separated by twice the distance of the middle coxae. Posterior margin of the first abdominal segment obtusely triangularly emarginate medially. Last abdominal segment elongate, rounded at apex, slightly convex longitudinally, especially apically. Surface of last abdominal segment with fine whitish hairs, only one scale and numerous plumose setae,

those along base broad and scalelike, those along margin and at apex, long and hair-like with fewer branches. Plumose setae also numerous on the penultimate segment of the abdomen, the middle and hind coxae, the mesosternum, between the fore coxae and on the entire undersurface of the beak.

No males of this species were seen.

Holotype, female, Huachuca Mts., Cochise County, Arizona, Miller Canyon, 6000 ft., August 5, 1952, H. B. Leech & J. W. Green (CAS). Paratypes, 10 females, as follows: ARIZONA: 5 females, same data as holotype; 1 female, Ramsey Canyon, Huachuca Mts., August 11, 1955, G. Butler & Z. Noon, *Quercus hypoleucoides*; 1 female, Southwest Research Station, Portal, July 4, 1956, oak, H. & A. Howden. MEXICO: 1 female, Sierra Chsrucio, Rio Mayo, Sonora, July 21, 1935, H. S. Gentry, in Van Dyke Collection; 1 female, 22 miles S. of Minaca, Chihuahua, August 23, 1950, Ray F. Smith; 1 female, Palos Colorados, Durango, 8000 ft., August 5, 1947, D. Rockefeller Expedition, Michener.

Paratypes are in the following collections: AMNH, CAS, UA, USNM, Howden.

The ten paratypes are quite uniform although collected from several different mountain ranges. Length varies from 4.1 to 5.3 mm. and width from 1.6 to 2.2 mm. The median dark vittae of the thorax are always present. The oblique fasciae of the elytra are sometimes more pronounced (particularly in the Mexican specimens) than in the type but are usually indistinct. There are often even fewer setae on the flat intervals of the elytra than in the holotype. The tuft of four setae at the base of the fifth interval is always present although the number of setae is sometimes reduced through abrasion.

Pandeleteius plumosiventris is quite distinct by three major characters which occur in no other United States species of *Pandeleteius*: its abundance of plumose setae, cluster of four erect setae at the base of the fifth interval, and alternately convex-setate elytral intervals. The slightly raised intervals of *P. subtropicus* are interrupted, not as conspicuously convex as in *P. plumosiventris* and all intervals have a few setae. Although very different in habitus, the head, beak, and scrobe of *P. plumosiventris* most resemble those of *P. robustus* among the United States forms of *Pandeleteius*. It is also related to *P. robustus* by the latter's rudimentary tuft of setae and smooth area on the female hind tibiae.

Three Mexican paratypes from Sonora, Chihuahua, and Durango, indicate that *P. plumosiventris* is wide-spread, if not common, in Mexico. Two Arizona specimens were collected on oak; otherwise, there are no biological data. The altitudes at which the specimens were collected vary from 4500 to 8000 feet.

Several specimens (all females) of a Mexican form of *Pandeleteius* were examined which were more closely related to *P. plumosiventris* than any

species in the United States fauna. This species bears the characteristic tuft of setae at the base of the fifth interval and has similar reticulate scales. However, it is quite distinct by its rufous metallic color, parallel-sided flattened elytra, evenly raised elytral intervals, and narrow setae.

Pandeleteius hilaris (Herbst).

(Plate 2, fig. 7.)

Curculio hilaris HERBST, 1797, p. 58, Table 100, figs. 7 and 8.

Hadromerus hilaris SAY, 1831, p. 10.

Pandeleteius pauperculus GYLLENHAL (in Schönheff), 1834, p. 130.

Pandeleteius hilaris LeCONTE, 1859, p. 270. HORN (in LeConte and Horn), 1876, p. 86.
BLATCHLEY and LENG, 1916, p. 120.

Color ferrugineus (teneral specimens) to cinereus and fuscous. Color pattern absent to very distinct with all degrees of expression of each part. Maximum expression as follows: white triangle on vertex, white vitta on thorax each side of midline roughly parallel to shape of thorax, broad whitish vitta on sides of thorax, black on raised basal portion of third and fourth elytral intervals, white on basal fourth of fifth interval, oblique white fascia about middle of elytra often bordered with black, common oblique white fascia just above declivity bordered with black anteriorly, deflected sides and apex of elytra with many white scales sometimes coalescing with the two fasciae. Undersurface light. Legs indistinctly broadly annulate.

Scales usually not contiguous; trapeziform or polygonal. Scales with or without fine margins and coarsely granular, sometimes nearly reticulate by coalescing of granulations into brief lines and occasionally with a small central tubercle (especially on the middle of the thorax and along the elytral suture).

Beak with sides slightly convergent, flat to strongly convex each side of deeply impressed median line which extends from between eyes to very near tip. Median line often carinate to tip when impressed line is not complete. Beak with scattered deep punctures. Tip of beak gently to abruptly deflected downward from apex of scrobes. Apical emargination shallow to moderate, triangular, carinate. Epistoma with anterior margin triangularly produced, extending outward to near outer edge of mandibles, often with vague median ridge from base to apex. Epistoma ferrugineous, surface granular to rugulose, shining. Scrobes cavernous at origin, deep throughout, arcuate, nearly reaching ventral surface of beak beneath front margin of eyes. First two funicular segments subequal, segments three to seven moniliform, becoming cubical distally. Eyes small, hemispherical, always extending well beyond sides of head when viewed from above.

Thorax most commonly longer than broad or as long as broad, but four

specimens (all females) from the East Coast and Texas were seen in which it was distinctly broader than long. Sides of thorax evenly arcuate, broadest behind middle, basal and apical constrictions moderately strong. Surface foveate-punctate except apical of apical constriction; a conspicuous recurved seta arises from the posterior margin of each puncture and is directed toward middle of apical margin of thorax.

Elytra with humeri prominent; thorax much narrower than elytra measured across humeri. Sides of elytra parallel to moderately divergent to middle, thence gently rounded to apex. In lateral view body behind prothorax of equal thickness, sometimes slightly thicker above first two abdominal segments in females. Bases of third and fourth intervals raised. Elytra with sides slightly inflated and convex from behind humeri and raised basal portions of third and fourth intervals, giving a characteristic appearance of an obsolete constriction most noticeable in females. Elytral striae appearing quite variable, shallowly striate-punctate to deeply punctate, the variation often being the effect of the vestiture and dirt particles obscuring the sculpture. Intervals convex; alternate intervals slightly broader and sometimes raised; each interval with a row of decumbent setae.

Fore legs moderately enlarged; femora gently bowed. Fore tibiae nearly straight, of even thickness throughout, curved inward at apical fourth. Inner edge of each fore tibia with 7 to 14 small equal teeth, sometimes with minute teeth interspersed between them; dense hairs sometimes obscure teeth. Hind and, to a lesser extent, middle tibiae each with small elongate area along inner edge at apex without scales, slightly flattened and densely hairy. This slight modification is present in both sexes but more conspicuous in males.

Males: Length 3.2 to 4.9 mm., width 1.2 to 1.9 mm. Last abdominal segment slightly convex, apex truncate to feebly emarginate, margin absent at apex. Posterior margin of first abdominal segment straight or indented, often slightly concave. Aedeagus (plate 2, fig. 7) slender, arcuate, apex with thin projection obliquely truncate.

Females: Length 3.9 to 5.6 mm., width 1.5 to 2.3 mm. Last abdominal segment completely margined, with groove parallel to margin originating in fovea each side of middle at base; groove sometimes obsolete at apex, apex broadly rounded to subtruncate. Last segment hairy, rugulose around margin, especially apically. Posterior margin of first abdominal segment indented medially.

The type of *Pandeteius hilaris* is probably in the Herbst collection which is in the Zoologische Museum, Berlin. The Schönherr collection is in the Naturhistoriske Riksmuseum, Stockholm, and the Gyllenhal collection is in the Zoological Institute, University of Uppsala.

This most widespread species of *Pandeteius* was designated by Schön-

herr as the type of the genus. About 500 specimens of *P. hilaris* were examined. It is quite common in the eastern United States from New Hampshire to central Florida and gradually diminishes in numbers west of the Mississippi River, western-most records being Maedona, Bastrop, and Paris, Texas; Norman, Oklahoma; Hope, Hot Springs, and Fayetteville, Arkansas; "Mo.," and Iowa City, Iowa. Canadian records include many locations in southern Ontario (Marmora being the northernmost record) and one record of "Manitoba." The latter record is dubious. The range of *P. hilaris*, then can be roughly defined as south of the 45° latitude and east of 98° longitude.

Specimens from peninsular Florida, Georgia, South Carolina, and North Carolina often have a lighter, more pronounced color pattern, patches of black scales outlining the white markings. This is not constant, however, and occasional specimens from the entire East Coast exhibit the same vivid colors.

Oak is the most common host of *P. hilaris*. A few specimens were seen with labels of hickory and of chestnut leaves (*Castanea dentata* and *C. pumila*). The geographical range of these species of *Castanea* is identical to the range of *P. hilaris*, although *C. dentata* is now nearly extinct. Blatchley and Leng (1916, p. 120) also list beech, smart-weed, and *Ceanothus* as "hosts."

Although *P. hilaris* is a quite variable species, it may always be distinguished from other North American species by its epistoma triangularly produced over the mandibles and with a median ridge; scrobes long and arcuate; fore tibiae with numerous small teeth and elytra faintly constricted behind humeri. Its range overlaps only that of *P. cinereus* in eastern Texas.

Pandeteius dentipes Pierce.

(Plate 2, figs. 1, 10.)

Pandeteius dentipes PIERCE, 1913, p. 403.

Color and markings like those of *P. hilaris*. Maximum expression of color pattern as follows: white "V" on vertex extending to apical constriction of thorax; obsolete thoracic vittae, white spot at base of thorax on either side of midline which may or may not be connected with apical markings by vague arcuate vittae; elytra with humeri white, an irregular patch of white on middle of disc, and a common irregular white patch on declivity. Legs indistinctly annulate. Scales like those of *P. hilaris*. Setae of dorsal surface very slender, long, nearly decumbent.

Beak similar to that of *P. hilaris*, dorsal surface narrowed anteriorly, apex deflected. Median line deeply impressed from between eyes to insertion of antennae; dorsal surface convex on each side of median line and with or without broad obsolete depression before eyes. Scrobes and pregenae

visible from above. Apex of beak triangularly emarginate. Epistoma with anterior margin obtusely triangularly produced, irregular. Scrobe long, variable; lower margin arcuate; upper margin evenly arcuate or obtusely angular before descending obliquely. Eyes prominent.

Thorax longer than broad, basal and apical constrictions moderately strong. Disc evenly foveate-punctate; impunctate above apical constriction.

Elytra roughly 1.8 to 1.9 times length of thorax in males, 1.9 to 2.1 times length of thorax in females. Humeri very narrow and inconspicuous. Elytra across humeri no wider than thorax in males, slightly wider than thorax in females. Sides of elytra divergent to middle thence narrowed to apex; elytra of males subcylindrical. Elytra of females much broader and flatter than those of males. Intervals slightly convex, much more convex at base. Striae of small punctures. Third and fourth intervals not prominent at base, fifth interval not prominent at its termination. Declivity nearly vertical, arcuate at its crest.

Fore legs moderately enlarged. Fore tibiae (plate 2, fig. 1) distinctly sinuate on inner edge, widest at middle. Inner edge of each fore tibia with 8 to 14 teeth with interspersed denticles; teeth largest at middle, diminishing in size toward either end. Hind and, to a lesser extent, middle tibiae each with a broad, apical, scaleless, and flattened area on inner surface; inner edges of tibiae finely serrate.

Males: Length 4.2 to 4.6 mm., width 1.4 to 1.7 mm. Fore and middle coxae equidistant, very narrowly separated. Last abdominal segment nearly flat, truncate to broadly, shallowly emarginate at apex. Aedeagus (plate 2, fig. 10) most like that of *P. hilaris* but much larger, the asymmetry of the tip more pronounced, slightly turned up.

Females: Length 4.6 to 5.7 mm., width 1.9 to 2.3 mm. Fore coxae slightly more widely separated than middle coxae; both coxae more widely separated than in male. Last abdominal segment slightly convex medially, broadly flattened marginally on either side of base, a shallow groove parallel to margin.

The type and paratype of *P. dentipes* are in the United States National Museum.

The known range of *P. dentipes* is between those of the closely related *P. hilaris* and *P. defectus*: south-central to western Texas. The eight specimens examined (four of each sex, including one male paratype) were from Kerrville; Morris Ranch in Gillespie County; Concan and Sabinal in Uvalde County; and Mariscal and the Chisos Mountains in Brewster County. The apparent rarity of this species and its spanning of an area which supports no other *Pandeteius* tempts one to speculate on its biology. None of the specimens bear biological data; specimens were collected in May, June, and July.

Pandeteleius dentipes is quite closely related to *P. hilaris* but is immediately distinguishable by the sinuate inner edge of the fore tibia and the very narrow humeri.

***Pandeteleius defectus* Green.**

(Plate 2, fig. 3.)

Pandeteleius defectus GREEN, 1920, pp. 196-197.

Pandeteleius defectus Green was described from a single specimen bearing the following data: "Chisos Mts., Tex., July 22, J. W. Green Collector." A specimen bearing identical labels to the type was the only other specimen seen from the type locality; both the type and topotype are in the California Academy of Sciences collection.

Both specimens are fresh females and very close except that the topotype has seven- instead of the six-segmented antennae of the type. In view of their similarity and the fact that at least one other species of *Pandeteleius* has a variable number of antennal segments (see discussion of *P. rotundicollis*), six-segmented antennae do not constitute a valid specific character, and these two specimens are considered to belong to the same species.

The following characterization of *P. defectus* is based on the type and topotype.

General size and shape of *P. hilaris*, but body is flattened and thinner behind the humeri than in female of *P. hilaris*. Both specimens are callow and so are light brown in color. The markings are composed of dark brown, light brown, and white scales as follows: white "V" on vertex continuing to apical constriction of prothorax; sides of prothorax light; epipleurae of elytra broadly white extending over humeri to base of fourth interval and extending again in broad diagonal fasciae just before middle and on declivity; bases of third and fourth intervals fuscous, broad fuscous patches in crotches of fasciae; remainder of disc with scattered small patches of lighter or darker scales.

Scales granular, flattened, usually with indistinct central pustule; not quite contiguous and margined on head and thorax; contiguous and mostly margined on elytra in topotype; neither margined nor contiguous on elytra in type.

Beak size and shape of that of *P. hilaris*. Median line deeply impressed from between middle of eyes to apical third. Emargination at apex of beak very obtusely triangular; apical margin of beak carinate, oblique. Epistoma very broad at base, its anterior margin very obtusely triangular with apex rounded (type) or broadly rounded (topotype), reaching about three-fourths to outer edge of mandibles. Scrobe of type short, broad, arcuate.

ending near lower margin of eyes; scrobe of toptype more angular. Eyes moderately prominent as in *P. hilaris* females.

Thorax slightly longer than wide, shape of that of *P. hilaris*. Sides gently arcuate, broadest just behind middle, constrictions moderate. Thorax sparsely, shallowly punctate below apical constriction, becoming impunctate above constriction; short impunctate area medially; as in *P. hilaris*, a seta at posterior margin of each puncture recurved and directed toward middle of apical margin of thorax.

Elytra approximately 2.5 times the length of thorax measured medially. Elytra with humeri prominent, basal portions of third and fourth intervals slightly raised; the obsolete transverse depression across elytra below humeri present, but slightly less apparent than in *P. hilaris*. Sides of elytra slightly divergent to middle, thence gradually rounded to form weak declivity. Elytral intervals nearly flat, alternate intervals slightly wider, not conspicuously raised. Each interval with a single row of setae, wider intervals with slightly more setae. Striae of small punctures separated by more than their length, each puncture containing a minute seta.

Fore legs moderately enlarged. Fore femora bowed. Fore tibiae (plate 2, fig. 3) of equal thickness throughout, bent slightly inward at apical and basal fourths; inner straight edge of each with four to six widely separated unequal teeth, an occasional serration or denticle between the teeth; teeth not obscured by hairs as is often the case in *P. hilaris*; inner edge serrate distad of the last tooth and with an apical tooth the size of the median teeth.

Fore coxae separated by almost twice the distance of the middle coxae. Posterior margin of first abdominal segment medially indented and depressed. Last abdominal segment distinctly, longitudinally convex medially to apex; with an oblique linear depression on each side at base equidistant between middle and sides; without the groove parallel to the margin found in *P. hilaris*; numerous fine setae over entire segment.

Length 4.4 to 4.6 mm., width 1.7 to 1.8 mm.

Occasional specimens similar to *P. defectus* occur in New Mexico, Arizona, California, Utah, and Colorado. These specimens apparently actually belong to *P. defectus*, but differ from the Chisos Mountains specimens and are much more distinct from *P. hilaris*. Like the Chisos material, they are all females. Since they show some distinctions and occur over a wide range, they are referred to here as the northern population and a description comparing them to the type follows.

Length varies from 4.3 to 5.7 mm. and width from 1.7 to 2.1 mm. Color darker, more gray. Color pattern essentially the same as type, but seldom as distinct. Scales usually not contiguous, without margins or central pustules, but light scales, on the sides of thorax and humeri especially, sometimes indistinctly margined. Scales often slightly convex on elytra, more

convex and more often pustulate on thorax along median line and on head.

Beak as in the Chisos specimens, but apical emargination is often more rounded. Epistoma with apical margin and length variable, but always broad at the base. Scrobe much more angular than in Chisos specimens, deep anteriorly, very broad but shallower medially. Anterior margin of scrobe abruptly arcuate; posterior margin nearly right-angled, passing very close to eyes, disappearing just before reaching ventral surface of beak.

Thorax often broader than long and in two specimens slightly longer than broad. Elytra thicker dorso-ventrally, as in the female of *P. hilaris*. Fore tibiae (plate 2, fig. 7) not always bent basally, with four to seven teeth which are usually equidistant.

Fore coxae slightly more widely separated. Last abdominal segment less convex apically, slightly shorter, and often with a suggestion of the groove parallel to the margin found in *P. hilaris*.

It is possible that this northern population is a different subspecies from the Chisos specimens. It differs in several important characters, i.e., the scales, scrobes, last abdominal segment, and thickness of body. The two populations are separated by a wide distance, the closest specimens seen of the two populations being from the Magdalena Mountains of central New Mexico, and the Chisos Mountains of Texas. This particular area is often the dividing line between two groups. The single specimen from the Magdalena Mountains is typical of the major population except in the thinness of its body, distinct color pattern and more convex last abdominal segment which characters are more like those of the Chisos specimens. Is this specimen an intergrade between two subspecies? Specimens from "Porvenir,"² New Mexico, are likewise a little atypical of the northern population in that the teeth of the tibiae are smaller than usual and the scrobe is less angular in one specimen. Otherwise, specimens from the next closest place, Jemez Mountains and Las Vegas, northern New Mexico, are completely typical of the northern population. No specimens were seen from the popular collecting places of Clunderoft, New Mexico, or the Davis Mountains, Texas; if the species occurs there, the specimens might help define the status of the populations. On the other hand, the absence of such specimens may indicate that the species does not occur there, that this area of southern New Mexico and western Texas is a geographic barrier, and that therefore the two populations are actually distinct.

The range of this northern population of *P. defectus* includes northern New Mexico, northern Arizona, Colorado, Utah, "Geysers," California, and "S. Cal." The only host record was a label reading "*Quercus Gambelii*," a common species of oak found at higher elevations in the area inhabited by *P. defectus*. Specimens were collected in May through October.

² Porvenir, New Mexico, is unknown to the author. If these specimens were mistakenly labelled New Mexico for Porvenir, Texas, it would explain their similarity to the Chisos specimens.

The absence of males among the specimens examined would seem to indicate either a parthenogenetic species or one in which the males were very elusive or rare. A series of 38 specimens was examined; they were collected over a period of 72 years, although the majority bear the date 1879.

This species is very close to *Pandeleteius hilaris* but may always be distinguished from it by the following characters: epistoma broader with its apical margin rounded or obtusely triangular; scrobes nearly right-angled, broad medially and descending nearly vertically close to the eyes; thoracic punctures shallower; fore tibiae each with four to seven widely separated conspicuous teeth with very few or no serrations between the teeth; fore coxae separated by twice the distance of the middle coxae; last abdominal segment of female slightly more elongate, more convex and with groove parallel to margin obsolete.

The range of *P. defectus* is well separated from *P. hilaris*, the closest specimens being *P. defectus* from the Chisos Mountains in western Texas and *P. hilaris* from Maedona near San Antonio in south-central Texas, the intervening area being largely desert and not apt to support *Pandeleteius*.

***Pandeleteius attenuatus* Howden, new species.**

(Plate 2, fig. 13.)

HOLOTYPE: *Male*, length 3.9 mm., width 1.4 mm.

Color fuscous-ferrugineous marked with white, cinereous, light brown, and piceous scales. Antennae and tarsi ferrugineous, antennal club piceous. Vertex with a broad "V" of cinereous scales. Thorax indistinctly marked with white on sides, on median line before apical constriction and obliquely on the apical constriction, a continuation of the "V" of vertex. Elytra with an elongate white spot before middle more or less surrounded by piceous scales, these piceous scales continuing to form an oblique fascia on apical third. Other elytral markings indistinct, but bases of first four intervals brown, bases of fifth and sixth intervals cinereous, and a cinereous oblique fascia below apical third. Legs mottled.

Scales granular, thin margins complete or present posteriorly only; numerous shapes but usually angular and not rounded; seldom contiguous. Entire dorsal surface set with long, slender recurved setae. Setae of various colors—white, tan, piceous, sometimes the same color as the scales beneath them, sometimes of strongly contrasting color.

Beak short, dorsum narrow with sides parallel so that scrobes and genae are broadly visible dorsally. Frons somewhat transversely prominent between eyes. Median line impressed from between eyes to apical third where the impression ends in a slightly foveate depression. Beak slightly convex on each side of median line, with sides rounded. Scales descending to apical

margin of beak. Beak deflected at apex as in *P. hilaris*; apex broadly, shallowly, arcuately emarginate, the emargination nearly vertical. Mandibles very short, i.e., when closed, protruding apically only a short distance. Epistoma very short, extending only slightly beyond apex of beak, broadly truncate apically. Scrobe sharply bent at middle, slightly broader medially, posterior margin passing close to eye, vanishing abruptly about half way to ventral surface of beak. First segment of funicle equal to second and third combined; segments four to seven stout; antennal club pointed elliptical. Eyes small, round, slightly prominent, scarcely protruding beyond sides of head when viewed from above.

Thorax distinctly longer than broad; constrictions moderate, sides arcuate. Disc flattened except for indistinctly tumid median line which extends from apical constriction half way to base. Punctures moderate, slightly shallower and more numerous than in *P. hilaris*.

Elytra in profile quite thin and flat, very gently sloping downward apically, with declivity obsolescent; this profile is quite distinctive. Elytra 2.15 times length of thorax. Elytra with humeri prominent; bases of second, third, and fourth intervals conjointly tumescent; sides subparallel. Striae fine with elongate shallow punctures; intervals nearly flat. Intervals with a single row of recurved nearly decumbent setae; intervals three and five with a few extra setae. Fifth interval not prominent at its termination.

Fore legs moderately elongate. Fore femora bowed. Fore tibiae very slightly bowed, bent inward at apical sixth, and of about equal thickness throughout. Inner straight edge of fore tibiae without any teeth or serrations; about seven small serrations on bent apical sixth, these obscured by hairs. Inner surface of hind and middle tibiae each with a very small, apical glabrous flattened area; inner edges of tibiae rough to serrate.

Fore and middle coxae separated by about the same distance—very narrowly separated. Posterior margin of first abdominal segment shallowly indented medially. Last ventral abdominal segment slightly convex transversely, apex broadly truncate, slightly deflected; with many rounded opalescent scales and fine white hairs.

Aedeagus (plate 2, fig. 13) with dorsal surface strongly arcuate, ventral surface sinuate in profile; thin apical projection long and with sides slightly convergent.

ALLOTYPE: *Female*, length 5.2 mm., width 2.0 mm.

Color pattern obsolete, surface lightly mottled fuscous. Scales more often contiguous with posterior margins raised, on many of the lighter scales particularly, simulating imbrication. Scrobes broader at end than in holotype. Thoracic punctures deeper than in holotype. Elytra 2.35 times length of thorax. Elytra decidedly broader medially, sides gently convergent from

middle to apex, the declivity even less evident than in holotype. Dorsally and in lateral profile the flattened, apically "attenuated" habitus of the elytra more pronounced. Fore tibiae bent inward at apical fourth; inner edge rough, but not serrate. Fore coxae more widely separated than middle coxae, both coxae more widely separated than the same coxae in holotype. Emargination of posterior margin of first abdominal segment broader and a little deeper than in holotype.

Last abdominal segment rounded at apex; disc very slightly convex; broadly flattened around margin; without scales but with many fine white hairs.

Holotype, male, Nogales, Arizona, April, 1897, Kochele (CAS). Allotype, female, same data as holotype (CAS). Paratypes: 51 males, 67 females, as follows: *ARIZONA*: 29 males, 41 females, same data as holotype; 1 male, Bear Canyon, Mt. Lemmon, May 19, 1953, A. & H. Dietrich; 1 female, Molino Basin, Mt. Lemmon, May 19, 1953, A. & H. Dietrich; 1 male, 2 females, Santa Rita Mts., May 6, May 12, May 27, Hubbard & Schwarz; 5 males, 4 females, Madera Canyon, Santa Rita Mts., October 18, 25, 1936, E. P. Van Duzee; 1 female, Sabino Basin, Santa Catalina Mts., September 2, C. H. Townsend; 1 male, 4 females, Prescott, June 17, 19, 20, Barber & Schwarz; 2 males, 1 female, Altar Valley, October 17, 1937, Oman; 1 female, Pinal Mts., 5000 ft., April, 1925, Edith W. Mank Collection; 1 female, Chiricahua Mts., June 2, Hubbard & Schwarz, #1528; 1 female, Chiricahua Mts., June 4, 1908, Van Dyke Collection; 1 female, Chiricahua Mts., 45-6000 ft., October 7, 1927, Tex Canyon, Cochise County, J. A. Kusche; 1 male, Southwest Research Station, Chiricahua Mts., September 26, 1956, A. M. Nadler; 6 males, 6 females, Southwest Research Station, Chiricahua Mts., September 30, 1956, L. J. Bottimer, on oak; 1 female, Cave Creek, Chiricahua Mts., July 4, 1930, J. O. Martin; 1 male, Palmerlee, Banks Collection; 1 male, Carr Canyon, Huachuca Mts., September 28, 1956, L. J. Bottimer, on oak; 1 female, Miller Canyon, Huachuca Mts., May 12, 1932, J. O. Martin; 1 male, 1 female, Huachuca Mts., Brooklyn Museum Collection, 1929; 1 male, Miller Canyon, Huachuca Mts., July 25, 1907, H. A. Kaerber. *NEW MEXICO*: 1 male, Post Office Canyon, Peloncillo Mts., September 25, 1956, L. J. Bottimer, on *Quercus emoryi*.

Paratypes are in the following collections: AMNH, CAS, CNC, CU, INHS, MCZ, OSU, USNM, UA, Bottimer, Howden, Sleeper.

Male paratypes vary in length from 3.3 to 4.7 mm. and in width from 1.3 to 1.9 mm.; females vary in length from 3.8 to 5.4 mm. and in width from 1.4 to 2.2 mm. Males average 3.8 mm. long; females average 4.8 mm. long. The color of *P. attenuatus* varies considerably from piceous with indistinct lighter mottling to completely pale cinereous with only the black markings described for the type. The markings most commonly found are:

white "V" on vertex, pale tumescence of thorax, broadly obliquely pale apex of thorax, dark area around scutellum, dark spot on elytra before middle, dark oblique band behind middle forming a "V" when it reaches suture, epipleura and apex of elytra broadly pale. Scales (especially pale ones) on the elytra often simulate imbrication with raised posterior margins and posteriorly pointed shapes; scales sometimes with a faint median pustule. The beak varies little, but the impressed median line is absent in a very few of the paratypes, and in these specimens there still remains the inter-antennal foveate depression. The mandibles and epistoma are very short in all specimens, but the anterior margin of the epistoma varies in shape (as in all species where it is produced over the mandibles and is subject to abrasion) from broadly truncate to lightly sinuate to slightly arcuate. The thorax is distinctly longer than broad, but the constrictions vary from moderate to strong, always strong dorsally. The slightly tumescent median line of the thorax is quite constant, although never pronounced; the scales on the tumescence are usually smaller and pustulate. In lateral profile the elytra and body beneath are always thicker at the base, gradually thinning toward apex, presenting a thin drawn-out habitus. The elytra of females when viewed dorsally are slightly produced apically. The fore tibiae in a few specimens are thinner at the apical curve, never with teeth, with five to eight small serrations on apical inner curved edge. The last abdominal segment of the female is sometimes nearly truncate at the apex but always with its margin broadly flattened which helps distinguish it from the male.

This is a quite distinct species among North American *Pandeleteius*. Its beak places it in with the *P. hilaris* group; its strongly constricted thorax approaches that of *P. rotundicollis*. The complete lack of teeth on the fore tibiae and the flattened elytra which give the beetle its "attenuated" habitus (hence its name) are unique among North American species of *Pandeleteius*. Also characteristic are the very short mandibles, very short and broad, obtuse epistoma, tumescent midline of the thorax, attenuate apex of male aedeagus, and elytra which are widest at middle in females, subparallel in males. Its type locality of southeastern Arizona would indicate that it occurs in Mexico also, but no specimens were seen from there, and no species in Champion's "Biologia Centrali-Americana" resembles it.

***Pandeleteius rotundicollis* Fall.**

(Plate 2, fig. 16.)

Pandeleteius rotundicollis FALL, 1907, p. 262.

Pandeleteius depressus PIERCE, 1913, p. 403. *New synonymy.*

Pandeleteius bryanti TANNER, 1954, p. 76. *New synonymy.*

Color dark brown to black, marked with white, testaceous, and piceous scales as follows. Thorax usually with a central dark fusiform area; elytra

often with apices light and with an oblique light spot on basal third at sides. Overall color varies from largely fuscous with distinct markings to largely white.

Scales granular with a pronounced central tubercle; not margined; contiguous or not. When in large clusters, the white scales often imbricated posteriorly. Setae of dorsal surface very fine, recurved, inconspicuous.

Beak long, rather thin. Sides of head and beak gently convergent from base to apex; sides of beak nearly vertical toward apex, so that only the basal portion of the scrobes are visible from above and the pregenae are visible in front of the eyes. Dorsal surface of beak flattened, quite variable; usually with a deep fovea between anterior margin of eyes, median line vaguely to deeply impressed, basal two-thirds of beak slightly to strongly concave, with a faint transverse ridge across beak between insertion of antennae. Apex of beak deeply acutely triangularly emarginate. Anterior margin of epistoma triangularly emarginate. Scrobes long, arcuate in front of insertion of antennae, straight behind insertion, descending obliquely and reaching undersurface of beak below front margin of eyes. Antennal funicle usually six-segmented, but sometimes five- or seven-segmented (see discussion following description). Middle segments of funicle moniliform, becoming wider than long.

Thorax wider than long, strongly rounded at sides, broadest near middle. Basal and apical constrictions strong laterally, moderate to weak dorsally. Disc flattened, with or without vague median line and with scattered deep punctures. An oblique depression often faintly visible on disc on each side of middle.

Elytra across humeri 1.1 to 1.3 times length of thorax. Elytra of male 2.6 to 2.9 times length of thorax; elytra of female 3 to 3.5 times length of thorax. Humeri prominent. Elytra parallel-sided on basal sixth, inflated behind basal sixth, more so in female. Sixth interval prominent at its termination below declivity. Striae composed of small elongate punctures. Intervals equal, slightly convex with scattered, very inconspicuous setae.

Fore femora greatly enlarged. Fore femora each with a short obsolete glabrous groove on inner edge near apex, marked dorsally by a crescentic projected margin. Fore tibiae longer than their femora, inner edge of each with five to nine small but conspicuous, blunt, irregularly-spaced teeth; scattered minute denticles between teeth. Apical tooth of fore tibiae long and acute. All tibiae usually straight, but in a few specimens from Arizona and Mexico, the tibiae are gently bowed inward, the reverse direction of the bowed tibiae in other species.

Males: Length 3.6 to 4.5 mm., width 1.4 to 1.9 mm. Last segment of abdomen apically deflected and emarginate. Fore and middle coxae nar-

rowly and equally separated. Aedeagus (plate 2, fig. 16) in lateral profile thick medially, extreme apex upturned; apical opening elongate-oval.

Females: Length 4.1 to 6.6 mm., width 1.7 to 2.7 mm. Last segment of abdomen often slightly directed downward, bluntly rounded apically, with a shallow dark indentation at the base either side of the midline. Fore coxae separated by twice the distance of middle coxae.

This species was seen from the mountains of south-central Arizona; Clouderoft and Las Vegas, New Mexico; the Davis and Chisos mountains of western Texas; Tejupileco, Temescaltepec, Mexico; and Gaborachie, and 35 miles west of Balleza in Chihuahua, Mexico. Over 100 specimens were examined.

Host records include oak, wild walnut, and pine, and many specimens were taken by the author at light at the Southwest Research Station in the Chiricahuas. Intensive collecting in the Chiricahuas in the summer of 1956 did not turn up any specimens of *P. rotundicollis* until after the first shower of the rainy season. Three days after the first rain, the first specimen (a female) was collected. It still had both mandibular cusps in place and appeared freshly emerged.

Pandeleiteius rotundicollis is a highly variable species, but may be at once distinguished from other species of *Pandeleiteius* in the United States by the glabrous groove with projected margin on the fore femora; usually six-segmented funicle, greatly enlarged fore legs, tuberculate scales, and short thorax with strongly constricted sides and flattened disc.

The funicle of *P. rotundicollis* is usually six-segmented, but specimens were seen with seven- and five-segmented funicles. In a series of 19 specimens (all females) in the United States National Museum collection and all bearing the label "Chiricahua Mts.," June 1 to 7, seven specimens have seven-segmented funicles, nine have six-segmented funicles, two have an intermediate condition in which the third and fourth segments appear fused, and one specimen has a six-segmented funicle on the right side and a five-segmented funicle on the left side. Pierce's type material of *P. depressus* is from this series, but only five of his paratypes were seen. Of the five paratypes, three have seven-segmented funicles, one has a six-segmented funicle and one is "intermediate." All the specimens of the series are uniformly large with many pale scales, but no characters could be found that distinguish seven-segmented specimens (*P. depressus*) from others.

Another female with one five-segmented funicle and one six-segmented funicle was collected by the author at the Southwest Research Station in the Chiricahua Mountains in 1956. Of the nine Mexican specimens examined, seven have seven-segmented funicles, one has the intermediate condition, and one has six-segmented funicles.

Two paratypes and 10 topotypes of *P. bryanti* Tanner were studied and

compared with large series of *P. rotundicollis*, including two topotypes of the latter. The two paratypes (one male, one female) of *P. bryanti* (Ft. Davis, Texas) and the two topotypes (males) of *P. rotundicollis* (Clouderoft, New Mexico) were compared with particular reference to the distinguishing characters listed for *P. bryanti* with the following results. One paratype is smaller, one larger than the specimens of *P. rotundicollis*. Each species is represented by one specimen with a flattened beak and one specimen with the concavity quite pronounced. Segments three to five of the funicle are equally moniliform, prothorax equally dilated, thoracic punctures deeper in *P. bryanti*, prothoracic tibiae equally bent at apex; tarsi, claws and femora similar; scales not fewer nor "less compact"; color brown in all four specimens; scale pattern as distinct as in *P. rotundicollis*. In view of the above comparisons, *P. bryanti* is here considered a synonym of *P. rotundicollis*.

Pandeleteius longicollis Champion.

Pandeleteius longicollis CHAMPION, 1911, p. 206.

Until Champion's eotypes of *P. longicollis* can be examined, the following species can be only tentatively referred to *P. longicollis*.

Overall color gray to beige; in teneral specimens, the ferrugineous color showing between the scales presenting a beige color; in older specimens, the darker brown color of the insect giving a more cinereous color. A few obscure markings of brown scales consisting of a median vitta on thorax and several to numerous small irregular spots on disc of elytra.

Scales oyster white and usually contiguous on the thorax and not contiguous on the elytra. Scales granular, faintly pustulate, not margined, those at the apex of the beak circular, shiny, and opalescent. Scales of under-surface shiny and often iridescent.

Setae of dorsal surface very slender, short, and inconspicuous, somewhat more prominent on sutural interval at declivity.

Beak long, flat; sides parallel and nearly perpendicular so that pregenae are only slightly visible from above. Median line impressed from near posterior margin of eyes to middle or apical third of beak where it becomes gradually carinate, the carina continuous with the carina outlining the emargination of the beak. Apical emargination of beak deep, ogival, the beak declinate from the base of the epistoma. Epistoma slightly concave, anterior margin triangularly emarginate to about middle, surface rugulose. Mandibles large, black, with honeycomb sculpture. Scrobes long, evenly arcuate, approaching lower margin of eyes. Eyes large, oval, obliquely truncate ventrally, flattened.

Thorax subcylindrical, flattened dorsally, one-sixth longer than wide. Basal constriction moderate to slight; apical constriction obsolete, laterally

as well as dorsally. Sides gently divergent from base to apical third, then rounded to constriction. Thoracic punctures moderate to deep, evenly distributed, much shallower on apical third.

Elytra 2.5 to 2.6 times length of thorax; elytra across humeri approximately 1.3 times width of thorax. Humeri oblique. Sides slightly divergent to middle thence gently rounded to apex. Intervals slightly convex; striae of small punctures. Sutural interval tumid at declivity, perpendicular for about two-fifths of the distance to the apex, thence directed slightly apicad. When viewed dorsally apex is scarcely visible beyond swelling. Fifth and sixth intervals not at all prominent at their terminations below declivity.

Fore femora greatly enlarged. Fore tibiae as long as fore femora, slender, slightly arcuate. Inner edge of each fore tibia with six to eight blunt teeth and numerous small denticles and tubercles. Hind and middle tibiae each with narrow strip along inner edge without scales, but with long hairs; usually two to four slender dark spines on inner edge.

Fore coxae separated by slightly more than middle coxae, both coxae very close. Last abdominal segment elongate, nearly flat, with obsolete depression on either side near margin; apex rounded, completely margined.

Length of females, 4.5 to 6.6 mm., width 1.6 to 2.4 mm.

The above description is based on 11 females from the East Coast of Texas and Mexico. A male specimen from Jalapa, Mexico, which possibly also belongs to *P. longicollis*, differs from the females in the following respects. Length 4.2 mm., width 1.4 mm. Elytra 2.4 times length of thorax; sides of elytra less divergent. Elytral declivity rounded at crest and oblique. Fore and middle coxae more narrowly separated. Last abdominal segment flattened with apex slightly deflected, truncate, not margined. Aedeagus long, trough-like, orifice at basal two-fifths; sides from orifice nearly to apex curved over the dorsal surface.

Specimens of *P. longicollis* were seen from Brownsville, La Paloma, and Lake Corpus Christi in southern Texas; Jalapa, Veracruz; Oaxaca, Oaxaca; and Yucatan in Mexico. Champion described the species from two specimens ("males?") from Oaxaca, Mexico. These localities are in a remarkably straight line on the East Coast of Texas and Mexico. They were collected in March, May, June, July, December, and January. Three specimens in the United States National Museum collection were apparently intercepted from Mexico at a quarantine station, one on a string bean leaf.

The specimens of this species which were examined disagree in several respects with Champion's description, but correspond with the major points of the description and drawing. The tibiae on all specimens appeared unmodified, whereas Champion states that, "Intermediate tibiae hollowed near the apex within." Champion described the antennal club as "large," and it is slightly thicker than the club of *P. albisquamis* Champion with which he

frequently compares *P. longicollis*, but does not otherwise seem large enough to draw attention.

The major discrepancy is, "Tarsi with the bilobed joint stout." In the specimens examined the third tarsal segment seemed of proportionately normal size and was even smaller than in two female cotypes of *P. albisquamis* for which the size is not mentioned. In the largest specimen of *P. longicollis* at hand, the third tarsal segment was equal in size to that of a male cotype *P. albisquamis*.

The pale, often immaculate color and elongate shape alone are sufficient to distinguish this species from other United States *Pandeleiteius*, and when the structural characters of the beak, thorax, and elytral declivity particularly are considered, it is very distinct.

Pandeleiteius longicollis connects the United States species of *Pandeleiteius* to the genus *Hadromeropsis* Pierce, if it does not actually belong in that genus itself. Characters common to *P. longicollis* and *Hadromeropsis* are: beak long and flat dorsally; sides of beak parallel, perpendicular, apex of beak and mandibles gently declined from base of emargination, which is deep, narrow; scrobes long, arcuate; sides of beak deeply emarginate; thorax truncate basally and nearly truncate apically, scarcely produced over head and with apical constriction obsolete; fore and middle coxae very narrowly separated (in *Hadromeropsis opalinus* Horn the fore coxae are contiguous); fore femora greatly enlarged; elytra elongate, scarcely widened posteriorly; aedeagus long, flattened dorsally. The generic status of Neotropical species in this group is in need of careful consideration.

Hadromeropsis opalinus Horn

Hadromeropsis opalinus HORN (in LeConte and Horn), 1876, p. 85.

Pandeleiteius viridissimus VAN DYKE, 1943, p. 108. *New synonymy*.

Examination of a female paratype of *Pandeleiteius viridissimus* Van Dyke shows that it is actually *Hadromeropsis opalinus* Horn.

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